DIESEL and GAS ENGINE PROGRESS

DIESEL ENGINES • DUAL FUEL ENGINES • NATURAL GAS ENGINES • GAS TURBINES

FIVE DOLLARS PER YEAR MARCH, 1960 FIFTY CENTS PER COPY

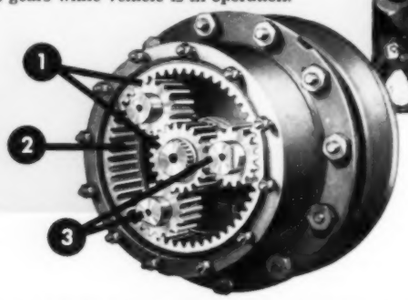
Rockwell's refined full planetary design has these exclusive features:

1. **FLOATING RING AND SUN GEARS** assure equal distribution of stresses to all planetary gears.

2. **CONCENTRICALLY MOUNTED RING GEAR** allows perfect alignment and fit—plus freedom of bending forces on hub and spindle splines.

3. **FORGED ALLOY BRONZE PLANET PINION PINS** have rifle drilled lubrication channels and machined lubrication flats to assure full-time lubrication.

4. **FULL FLOW LUBRICATION** design gives constant flow of lubricant to wheel bearings and all planet gears while vehicle is in operation.



"TIMKEN-DETROIT® PLANETARY AXLES

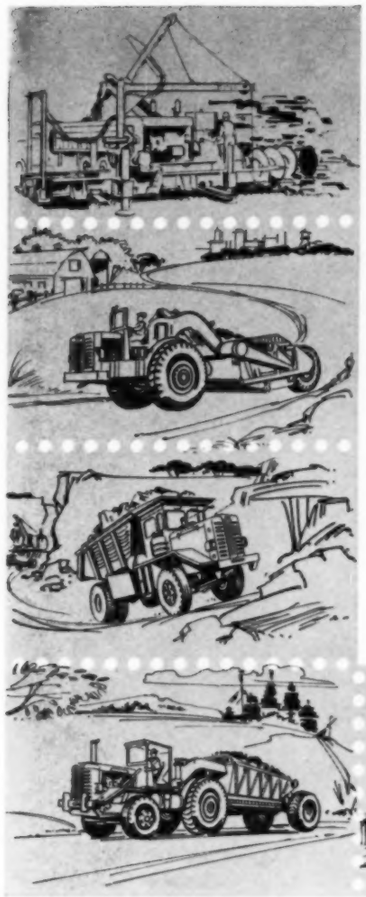
BEST DRIVE FOR THE HEAVYWEIGHTS!"

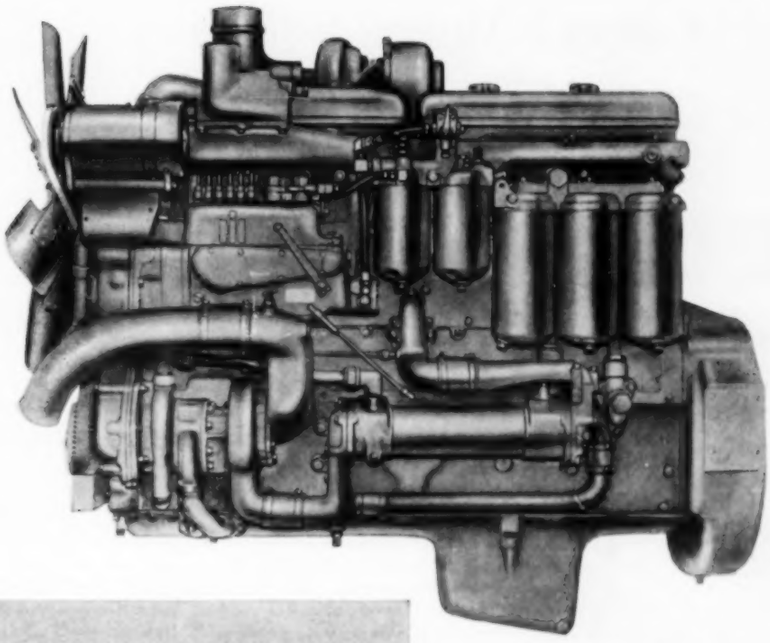
Here's new rugged dependability for prime movers, four-wheel tractors, heavy off-road wagons, mining and agricultural equipment, and many other heavy-duty applications. Rockwell-Standard's complete line of planetary axles are available in capacities up to 150,000 pounds. And to meet every job need, there is a planetary steering axle operationally matched to each rigid planetary in the line.

The large reductions possible with Rockwell's full planetary, double-reduction axles enable them to ideally perform most heavy-duty off-highway operations. Because the substantial planetary reduction is located in the wheel hub, axle shafts and first reduction gears carry only nominal torsional loads—give long trouble-free service. For the best heavyweight drive, specify Timken-Detroit.

Another Product of... **ROCKWELL-STANDARD CORPORATION**

Transmission and Axle Division, Detroit 32, Michigan





NEW UDT-817 DIESEL is a 4-cycle turbocharged engine with 817 cu. in. displacement and max. torque of 1,040 lbs. ft. @ 1,400 rpm.

New power, performance and price leader in the 385-hp diesel class

Here are three fast facts about the turbocharged, new direct-start, direct-injection International 6-cylinder UDT-817 diesel that can mean big savings powering your equipment:

POWER—The UDT-817, developing 385 hp., leads the field in its size class.

PERFORMANCE—The specific fuel consumption of the UDT-817 is the lowest in its size class.

PRICE—The UDT-817 is the lowest priced engine in its size class in dollars per horsepower.

A wide variety of accessory equipment including air cleaners, flywheels for leading makes of torque converters and clutches, torque converter cooler, air control compressors, safety shut-offs, instruments and engine controls can be furnished to meet your installation requirements. Base, radiator, hood and dash, clutch and power take-off are available for complete power units.

The new 250-hp. D-817 is the naturally aspirated version of this same basic diesel engine. Your nearby International Engine Distributor or Dealer can give you full details of either new model or on the 30 other diesel and carbureted construction equipment engines in his line. All 32 engines have one common feature—fastest payback power for users.

INTERNATIONAL®
ENGINES

International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors... Self-Propelled Scrapers and Bottom-Dump Wagons... Crawler and Rubber-Tired Loaders... Off-Highway Haulers... Diesel and Carbureted Engines... Motor Trucks... Farm Tractors and Equipment.

General Motors Reliability in Action...

Standby Power...

FOR THE LIGHT THAT NEVER FAILS!

NEW OAK ISLAND LIGHTHOUSE DEPENDS ON HARRISON-COOLED DIESEL GENERATOR FOR POWER IN EMERGENCIES!

Cape Fear no longer haunts the seamen who ply the Atlantic Coastal Waters off North Carolina! Oak Island Lighthouse—newest and most powerful in the United States—gives ample warning of the dangerous shoals through rotating lights and a radio signal. A GM Diesel-powered standby generator set insures that the 14,000,000 candle-power light and the radio beam shall never fail in foul weather! And a Harrison heat exchanger cools the engine oil on this reliable generating equipment. Harrison—with a half century of experience in the heat-control field—assures you of top-quality products that are researched and engineered to control vital temperatures with maximum efficiency. The most advanced industrial, aviation and marine equipment relies on Harrison heat exchangers. If you have a cooling problem . . . look to Harrison for the answer.

Harrison Heat Exchangers—Reliable Products of General Motors Research and Engineering.

GM HARRISON

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HARRISON RADIATOR DIVISION, GENERAL MOTORS CORPORATION, LOCKPORT, NEW YORK

DIESEL AND GAS ENGINE PROGRESS

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CONTENTS FOR MARCH, 1960

Houston Gas Turbine Meeting International in Scope 25
Why Standby Power 28
Ice Breaking Cargo Ship 30
Little Rock's $5-Million Sewer Job 32
Williston Basin Oil Rigs Log Impressive Eight Year Record 34
Motor Vehicle Tunnel to End a Traffic Bottleneck 36
Convert Sand Ship to Diesel-Air 38
Cummins' New Diesels for Stop-and-Go Service 40
Diesels Guard, Power Trans-Canada Relay System 44
Tulia, Texas Diesels Write a Low Cost Story 46
Diesels Cut Fuel Costs, Increase Speed of Yachts 48
What's Going on in England? 50
Diesel Service Progress 52
Pumps Work to Control Water Flow 54
New Freight Locomotives in Demonstration Runs 78

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FRONT COVER ILLUSTRATION

Dodge D-600 truck, repowered recently with a GM 4-53 diesel engine, on a run through the mountainous country near its Anniston, Ala., home plant. Truck is owned by General Electric Co.

DRAGLINE BY KOEHRING / CATERPILLAR ENGINE POWER

1st of a series—

WHY IT'S GOOD BUSINESS TO SELL CAT ENGINES IN ORIGINAL EQUIPMENT

- They provide profitable power for the contractor
- They complement the performance of the Original Equipment Manufacturer's machine
- They help increase the customers' acceptance of the engine-machine combination sold by the OEM's Dealer

Customer satisfaction with Caterpillar Engines is indicated by their world-wide use in virtually every type of construction equipment. Equipment manufacturers have been offering Cat power in their machines for more than 28 years. The high performance record of these engines has paralleled the performance of their counterparts which power Caterpillar-built Tractors and Motor Graders.

The Original Equipment Dealer can sell Cat Engines in excavators, crushers, batch plants and other construction machinery with confidence. The sale helps build customer satisfaction which leads to repeat sales.

Write for additional information about Caterpillar Diesel Engines and their application in Original Equipment.

WHEN YOUR CUSTOMER SPECIFIES A CAT ENGINE... HE GETS:

- **Certification of horsepower**
- **Engine service available from Caterpillar Dealer**
- **Genuine Cat parts availability regardless of engine age**

CATERPILLAR

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Engine Division, Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

Sludge in engine ends with switch to STANODIESEL Oil M

Situation: For five years a 1,400 hp. engine in the Municipal Light Plant, Arcadia, Wisconsin, was operated on STANODIESEL Oil M. During this time the engine ran free and clean. It carried a major share of the plant's 20,000 kw output. A decision was made to switch the engine to another lubricant since it was believed one oil was as good as another.

What happened: Within two years the engine had sludged up so much, the oil had to be removed and replaced by STANODIESEL Oil M. Three months later the engine had cleaned up and was again carrying its share of the plant's load.

Clean engine operation is possible with STANODIESEL Oil M because of its superior base stock and its combination of additives that are available in no other oil. Superior base stock and exclusive additives give you these cost-saving operating and maintenance advantages: less sludging, low oil consumption, reduced port deposits, fewer stuck rings, less need for ring replacements, less cylinder wear, lower filtration costs, fewer bearing problems.

Get more facts about STANODIESEL Oil M. Call the Standard Oil office near you in any of the 15 Midwest or Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

You expect more from **STANDARD** *and you get it!*

The team that got the engine back in shape; (l. to r.) Vernon Schwertel, Ronald Darbo and Standard's Fred Parkinson. Providing lubrication technical service on problems like this one is not new to Fred Parkinson. He's been doing it for 11 years. He has further qualification for such work—an engineering degree from Brown University. Fred has also completed the Standard Oil Sales Engineering School.

Quick facts about STANODIESEL Oil M

- Keeps crankcase, pistons, cylinder walls clean.
- Combats deposit and wear problems imposed by economy fuels.
- Maintains film on difficult-to-lubricate parts.
- Eliminates fuel injector and pump sticking caused by deposits on injector barrel and plunger where fuel and lube oil mix.

. . . from 800° Fahrenheit . . . to 65° below zero

Environmental testing helps develop dependable Woodward Gas Turbine Fuel Controls

The high temperatures encountered with supersonic speeds are carefully simulated in Woodward's newest environmental testing facilities.

Here, complete fuel controls for jet engines are thoroughly tested in ambient temperatures up to 500° with fuels heated to 400° and hydraulic fluids up to 600°. The probe of the control's temperature sensor is checked at 800° ambient temperature.

Environmental testing at Woodward does not stop with the safe handling of fuels and fluids at high temperatures. From the 800° maximum, temperature is carefully controlled down to 65° below zero to study a variety of other fuel control problems . . . the effects of unequal expansion and contraction of dissimilar metals as temperature shifts . . . sealing problems . . . icing problems caused by condensation in fuel at low temperatures . . . tests in which controls operate on fuels contaminated with additives like silicon dust, salt water, iron oxide, organic fiber and naphthenic acid.

Life tests are also conducted to establish the endurance limits of complete controls, assemblies and parts.

It's all part of Woodward's continuing technological progress in developing the best possible governors and fuel controls for modern prime movers.

Making changes during a high temperature test.

Each test cell has a control console for regulation of all inputs from outside the cell.

Visit us at the A.S.M.E. Show March 6-9 Booth No. 48

WOODWARD GOVERNOR COMPANY

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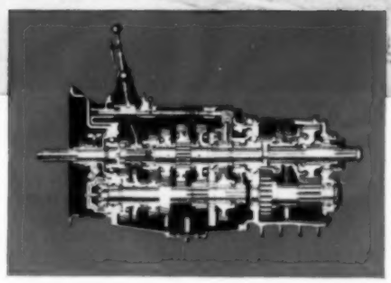
WORLD'S OLDEST AND LARGEST MANUFACTURER OF HYDRAULIC GOVERNORS EXCLUSIVELY



Wells Overseas, Ltd., an associated company of Wells Cargo, Inc., Reno, Nevada, is using 16 KW-Dart 802-AT Tractors equipped with Fuller R-1160 ROADRANGER Transmissions in iron mining operations 250 miles south of Lima, Peru.

Geared with
FULLER ROADRANGERS

...91-TON LOADS

with double bottoms...

Featuring 9-speed Fuller R-1160 ROADRANGER Transmissions, 16 KW-Dart 802-AT Tractors handle up to 91 tons of iron ore at a time on a mining operation in Peru.

Owned by Wells Overseas, Ltd., the 320 hp KW-Darts use the single-stick, semi-automatic ROADRANGERS to provide maximum performance on the cross-country haul from crusher to the seaport of San Juan. Because the diesel engines can operate in the peak torque and hp range at all times, the 72-mile round trip is made in 3½ hours, including time for loading and unloading.

Ask about the Fuller Transmission designed to boost *your* profits.

STANDARD EQUIPMENT
on Fuller Off-Highway Transmissions

- **COUNTERSHAFT INERTIA BRAKE** . . . for quick, easy upshifts without double clutching . . . faster work cycles
- **PRESSURE LUBRICATION and FILTRATION SYSTEM** . . . for longer gear and bearing life . . . greater availability, less maintenance

FULLER

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Superior's low fuel oil consumption is measured here by (left to right) Clarence Garrett, Plant Supt., A. B. Reese, Jr., White's Chief Field Engineer, and V. V. Long, Engineering Consultant, Kingfisher, Okla.

Civic thrift at Kingfisher prompts Superior Engine purchase

Kingfisher, an Oklahoma wheat belt town of 3700 population, is proud of its low municipal taxation. Earnings from the city-operated power plant pay most local operating expenses and finance periodic improvements and expansion to the plant itself. As usual, city fathers were both cautious and thrift-minded when a new engine-generator was needed recently. Their choice was a Model 80-GDSX-8 dual-fuel supercharged Superior which develops 1769 BHP at 360 RPM, to drive a 1250 KW generator.

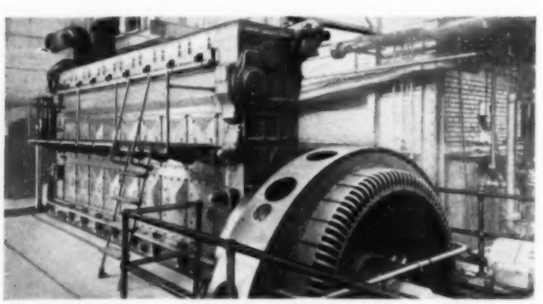
Today many municipalities are making a "Superior decision"! Superior's highly developed open chamber combustion system is combined with a series of exclusive design developments and refinements to produce high power-to-fuel ratio. Diesels can run on a wide range of non-premium fuels including residuals, and dual-fuels operate on natural or manufactured gas, butane, propane or sewage gas. Even after extremely long periods of low-maintenance operation, replacement parts are seldom needed.

Superior's complete line of diesel, dual-fuel and gas engines range from 190 to 2150 HP, or 150 to 1500 KW. Get full information today by writing to:

Superior ENGINES ATLAS Imperial DIESEL ENGINES White DIESEL

White Diesel

WHITE DIESEL ENGINE DIVISION
THE WHITE MOTOR COMPANY
Plant and General Offices: Springfield, Ohio



Kingfisher saved on installation. Experienced power plant crew poured base and completed hook-up.

NEW SPICER 1550 SERIES UNIVERSAL JOINTS...

Standard Assembly
Flange Yokes or End Yokes are Optional

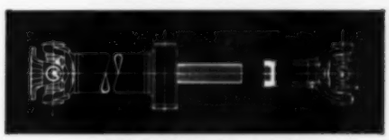
A bigger, more rugged universal joint for trucks with 29,000-30,000 GVW

Spicer is now manufacturing a completely new series of universal joint . . . the 1550 series. With 20% greater bearing factor and a minimum elastic limit 20% greater than previous 1500 series joints, the 1550 series is a bigger performance value . . . *at lower cost.*

High Angle—Inter Axle Assembly
End Yokes are Standard

The new 1550 series universal joints give you **these important performance advantages:**

- Reverse Spline Center Bearing construction.
- Crowned Bearing Races, for better bearing alignment, longer life.
- "U" bolt and snap ring design for reduced maintenance costs.
- Synthetic double lip type seal, for tighter, more positive sealing.
- Shorter length flange face to flange face on short coupled sets, to take full advantage of available space.
- Extremely close limits of static and dynamic balance for vibration-free operation.



Multiple Shaft Assembly With Center Bearing

Short Coupled Assembly
Flange Yokes or End Yokes are Optional

The 1550 series is now available in all present variations of the 1500 series—including short coupled, high angle and long slip propeller shafts.

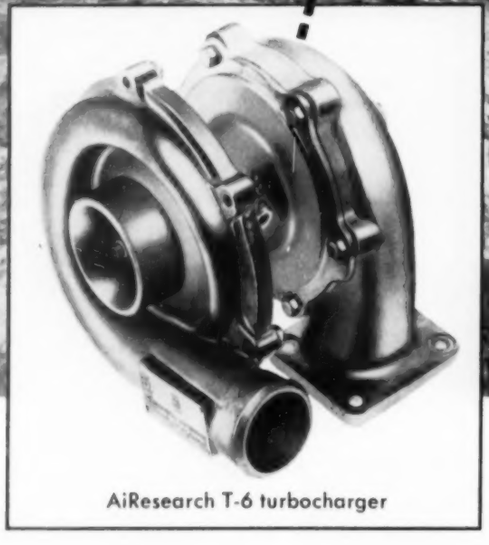
For more complete details on the new 1550 series universal joints write to Dana Corporation, Toledo 1, Ohio.

DANA Spicer **DANA CORPORATION**
Toledo 1, Ohio

SERVING TRANSPORTATION—Transmissions • Auxiliaries • Universal Joints • Clutches • Propeller Shafts • Power Take-Offs • Torque Converters • Powr-Lok Differentials • Gear Boxes • Forgings • Axles • Stampings • Frames • Railway Drives

Many of these products are manufactured in Canada by Hayes Steel Products Limited, Merritton, Ontario

AIRESEARCH ECONOMICALLY TURBOCHARGES SMALL TRACTORS



AiResearch T-6 turbocharger

International Harvester's TD-9 shows 18 percent more torque rise

AiResearch's small T-6 turbocharger now enables the 282 cu. in. engine on International Harvester's new TD-9 crawler to develop a torque equal to a naturally aspirated engine 25 percent larger in displacement. This low cost turbocharger substantially reduces the unit cost of small tractors operating at this power level.

Boosting this small block engine to 71 horsepower and greatly increasing its versatility, the above pictured T-6 model also provides up to 10 percent better fuel economy.

Weighing 24 lbs. and measuring 7¾ in. in diameter, the T-6 is one in a complete line of AiResearch turbochargers which makes the turbocharging of small diesel engines economically desirable.

AiResearch is a world leader in the development and production of air-cooled turbochargers and turbocharger controls for all major diesel engine applications. Your inquiries are invited.

THE GARRETT CORPORATION

AiResearch Industrial Division

9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS

"We tried burying the bucket in the bank but couldn't... thanks to that 21000 diesel"

— That's a comment on performance of the Allis-Chalmers 21000 diesel repowering a 2½-yd shovel belonging to the Electro-Metallurgical Co., Ltd., Killarney State, Ontario.

PERFORMANCE PROVED

"It now seems to have twice the power," says the operator of a Pennsylvania-owned machine in which a 16000 diesel replaced the original engine of another make.

PERFORMANCE PROVED

"17% less fuel, 30 minutes less trip time" — These are the savings effected when a 21000 diesel repowered a truck operated by a logging company in Idaho.

PERFORMANCE PROVED

"Plenty of reserve, with economy and dependability to boot," states the owner of Minnesota Construction Company, who has several pieces of equipment powered by 16000 and 21000 diesels.

"We can hardly believe the fuel economy" — "'Startingest' engine we ever had" — "Don't understand why anyone would want an old-fashioned 'smoker' again," comment others. Everywhere, on every type of installation, the amazing 16000 and 21000 are "performance proving" their greater economy, their top usable power, their superior starting. If you want diesel advantages like these, see your Allis-Chalmers dealer for details. Allis-Chalmers, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

POWER **FOR A GROWING WORLD**

BC-25

Here's why it pays manufacturers to specify Purolator air filters as original equipment

Materials Service Corporation of Lyons, Illinois tested Micronic® dry-type air filters for one year in its trucks and compressors. Even in the dust and dirt of contractor operations, these Purolator filters went from 6 to 8 weeks without servicing; lasted up to 3 months before replacement.

"We proved Purolator could save us up to $1000 per year per truck"

—Materials Service Corporation

Savings from reduced labor, parts cost, and maintenance downtime – plus prolonged engine life – amount to as much as $1000 per truck each year.

That's the verdict from Materials Service Corporation, after testing Purolator dry-type air filters in its trucks and compressors for a full year. At present they are operating trucks 6 to 8 weeks between element servicings. And their Purolator dry-type air filters are used up to 3 months without replacement.

These savings are common in fleets equipped with Purolator Micronic® dry-type air filters. That's because this Purolator filter is more than 99% effective at *all* engine speeds; its controlled porosity keeps all harmful particles from reaching the upper engine; it's easy to maintain and replace.

Remember these benefits the next time your customers specify Purolator Micronic air filters. Think about them, too, in considering Purolator air filters for original equipment on your own standard line of diesels.

Ask a Purolator Engineer to demonstrate how Purolator filtration provides advantages and economies for fleet owners – and benefits for you. Write or call today – and ask for the booklet, Purolator Micronic Dry-Type Air Filters.

Filtration For Every Known Fluid

PUROLATOR
PRODUCTS, INC.
RAHWAY, NEW JERSEY AND TORONTO, ONTARIO, CANADA

The relocated East Coast Service Office and Parts Warehouse was selected to improve our service to you—our customer.

Our business has been built on a combination of a good product backed up by a factory trained service organization using genuine parts. Through the years, our product has been improved and our service stepped-up so that if it be an injector change or a complete overhaul, the work will be done at a minimum of expense with a minimum of down-time.

Other Service Offices and Parts Warehouses are:

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San Francisco, Calif.
870 Harrison Street

St. Louis, Mo.
Barge G.M. Service
2 N. Wharf Street

CLEVELAND DIESEL ENGINE DIVISION
GENERAL MOTORS CORPORATION
Cleveland 11, Ohio

"At S. J. Groves & Sons, we've installed Donaclones on 275 engines so far."

Dave Armstrong, Maintenance Superintendent

Only 2% of dust reaches Duralife paper filter!

Embossing and pleating provide maximum filtration area. Controlled porosity gives 99.9% dust removal.

98% of dust removed here!

Cluster of Donaclone tubes make up highly-efficient primary centrifugal cleaning stage. Dust is ejected into dust cup for easy servicing.

Paper filters filter best, but it takes efficient pre-cleaning to make them practical from the servicing viewpoint. Note above that Donaclone tubes remove 98% of the dust. Only 2% reaches the Duralife filter, greatly increasing service life.

"Savings in service time and oil, and higher cleaning efficiency, were main factors in our choice."

World-famous S. J. Groves & Sons Company, is one of many contracting firms who have installed Donaclones on much of their heavy equipment. During the changeover to Donaclones, priority was given to machines which operate in heavy dust, where Donaclone efficiency and service savings are most marked.

Donaclones are the dominant choice, not only among heavy construction contractors, but also among engine and equipment manufacturers. Nearly all leading builders have shifted or are in the process of converting to Donaclone air cleaners.

Donaclones are 4 ways better. Their 99.9% cleaning efficiency is from 10 to 20 times better than oil-washed types, increasing engine life far beyond what is now considered normal and satisfactory. They use no oil, eliminate messy servicing and cost of oil, too! Servicing time is cut to a fraction of that previously required, and constant, low operating restriction saves fuel.

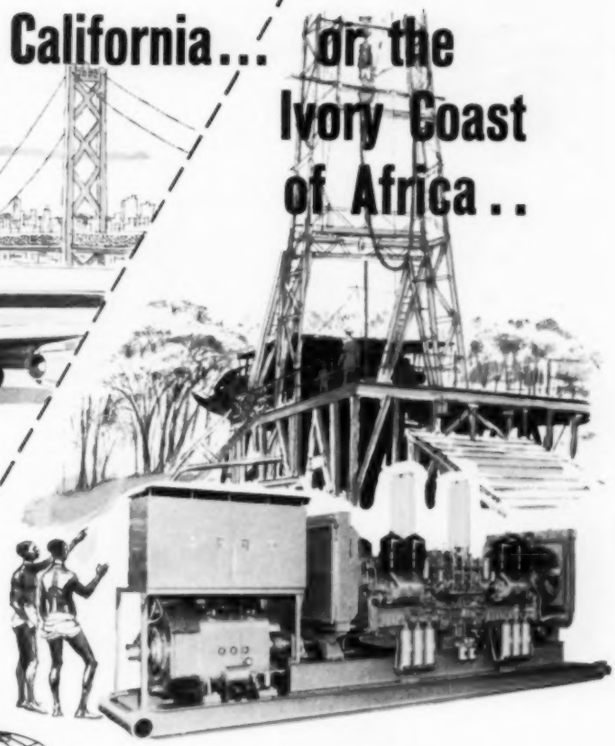
Add years to the life of your equipment! Convert to Donaclone protection now. Write or wire for name of nearest distributor.

Donaldson
COMPANY, INC.
666 Pelham Blvd.
St. Paul 14, Minn.

Donaclone
DUO-DRY
AIR CLEANERS

In San Francisco, California... or the Ivory Coast of Africa..

Stewart & Stevenson Self-Propelled, diesel powered, Airport Utility Unit providing electric power for a giant Boeing 707 Jet Liner.



Stewart & Stevenson RIGELECTRIC engine electric power unit supplying power for drilling operations on Laughlin Porter's oil drilling rig in Africa.

STEWART & STEVENSON

When it comes to diesel or gas engine power, Stewart & Stevenson experience and "know-how" have no boundaries.

Here again are two diesel engine power applications . . . in direct contrast and in opposite parts of the world . . . with one important characteristic in common: both were designed and built by Stewart & Stevenson Services, the world's largest distributor of diesel engines. Both power applications are serving vital industries where thousands of dollars and valuable contracts are totally dependent on the reliability and performance of this engine driven equipment.

When you need power . . . for any application in any part of the world . . . Stewart & Stevenson's experience, service organization and engineering will guarantee dependable performance. We will be glad to study your power needs and submit recommendations. Please write for additional information.

STEWART & STEVENSON

STEWART & STEVENSON SERVICES, INC.

Main Office and Plant: 4516 Harrisburg Blvd., Houston 11, Texas
Phone CApitol 5-5341
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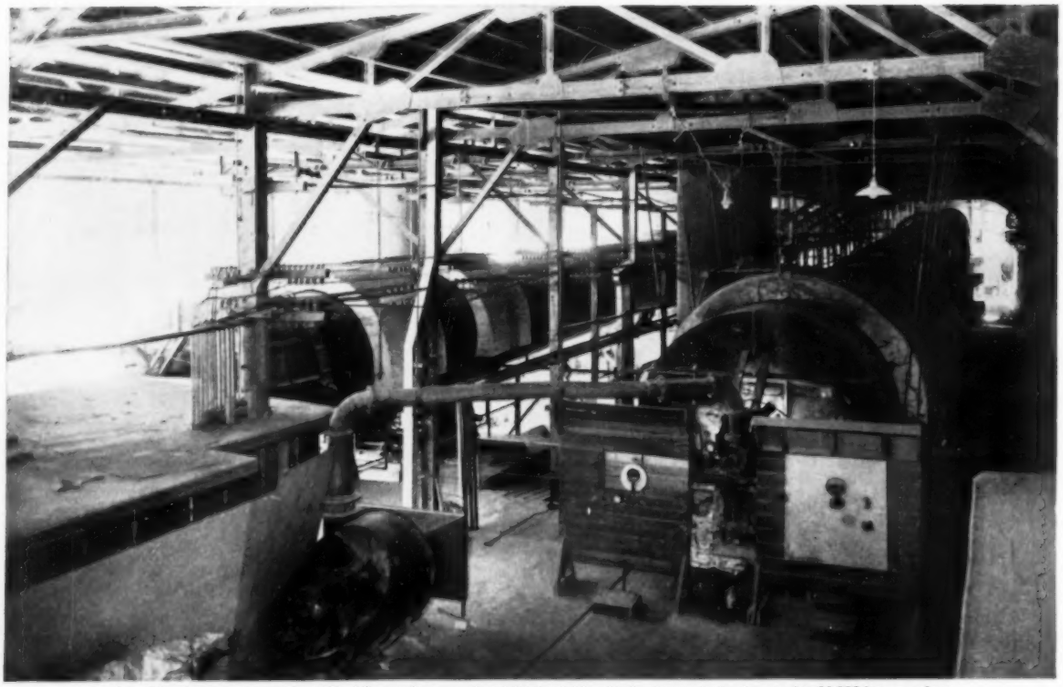
Export: Room 1405, 74 Trinity Place, New York, N. Y.

THE WORLD'S LARGEST DISTRIBUTOR OF DIESEL ENGINES



Two of four kilns now in operation at Rizal Cement Company plant. With fourth kiln added, unit capacity has increased to 20,000 bags per day.

LARGEST PHILIPPINE CEMENT MILL USES ENTERPRISE DIESELS WITH BENDIX FUEL INJECTION

Located just 22 miles from Manila in the town of Binangonan is the Rizal Cement Company. Since its construction in 1914, Rizal has been a major factor in the advancement and development of the Philippine economy. Ever-increasing production requirements since the close of World War II have necessitated major modernizations. A key factor in this expansion was the installation of an Enterprise DSC-38, 1000-kilowatt, turbo-charged diesel generator unit, equipped with Bendix* Fuel Injection equipment. This unit brought the plant's capacity to 3,000 barrels daily, more than six times its original capacity.

Still greater power requirements necessitated the installation of three Enterprise DSG-6's, rated at 325 kilowatts each. Then, finally, in 1958, another Enterprise DSQ-38, 1250-kilowatt diesel was installed, along with fuel treatment equipment converting the other Enterprise Diesels to selective fuel operation. Capacity is now 5,000 barrels per day.

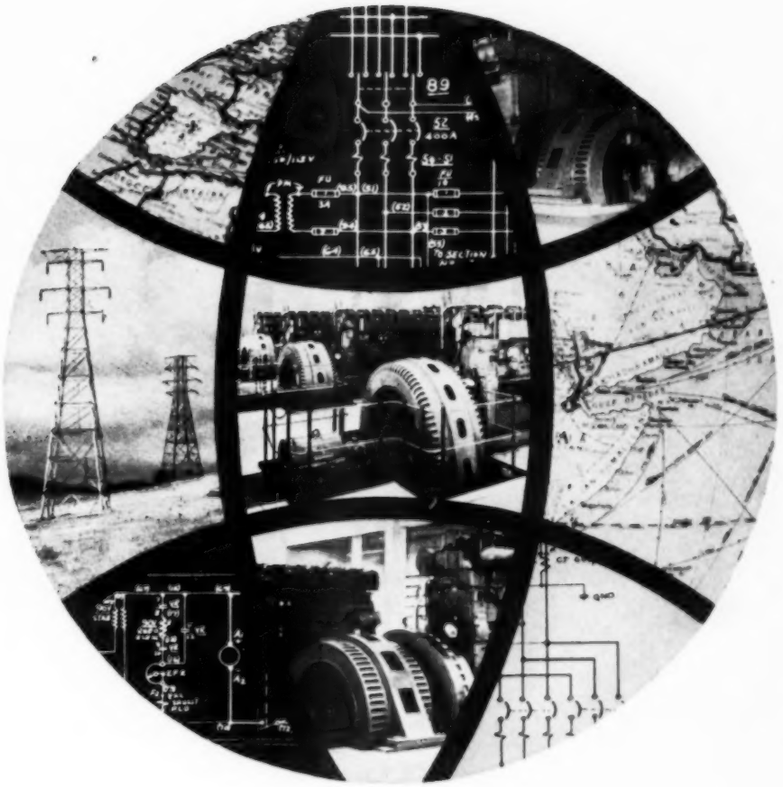
Use of Bendix Diesel Fuel Injection on all these power plants reflects the confidence that engine builders have always had in this superior equipment. It assures dependable, economical performance around the clock—and, of course, full-time operation is a necessity in a profitable cement plant. For full information on this quality equipment, write Scintilla Division, Bendix Aviation Corporation, Sidney, New York. *REG. U.S. PAT. OFF.

Bendix Fuel Injection equipment is used on all Enterprise Diesel engines at the Rizal Cement plant.

Scintilla Division
Sidney, New York

Bendix
AVIATION CORPORATION

Export Sales & Service: Bendix International Division, 205 E. 42nd St., New York 17, N. Y.



Chittagong, Bangkok, Teheran, Buenos Aires, in New York City and at the Dew line, we supply your power plant with diesel electric generators of unequaled reliability, rugged construction and high economy on diesel, gas or dual fuel. Our proof? Hundreds of plants all over the world. Send coupon now:

DEUTZ Diesels

Diesel Energy Corp., 82 Beaver St., New York 5, N. Y.
U. S. Subsidiary of Klockner-Humboldt-Deutz A. G. Cologne, W. Germany

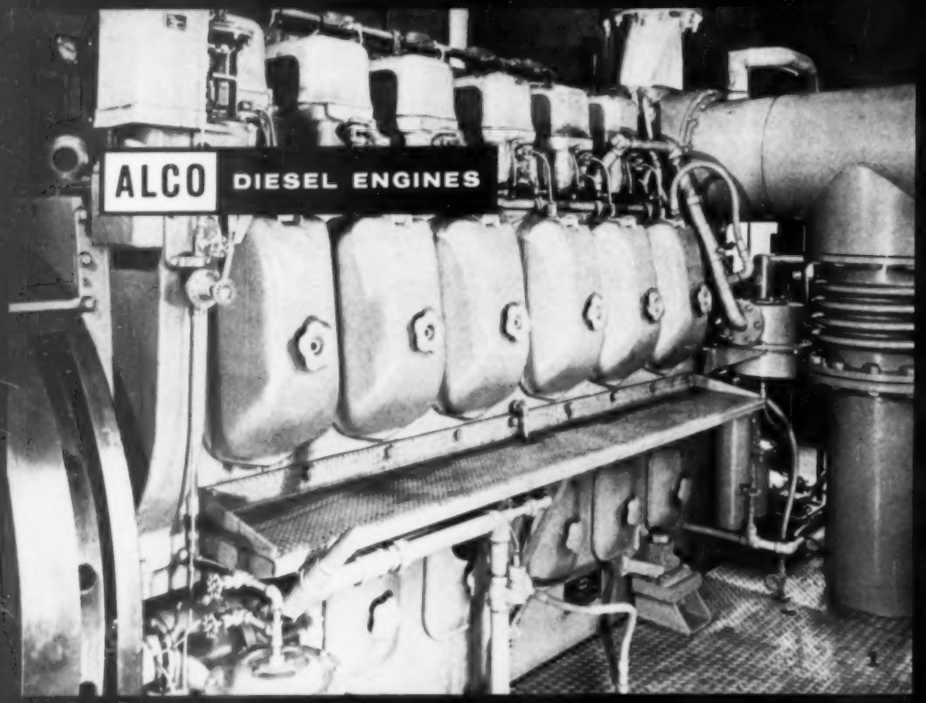
Send information on Deutz equipped d/e plants:

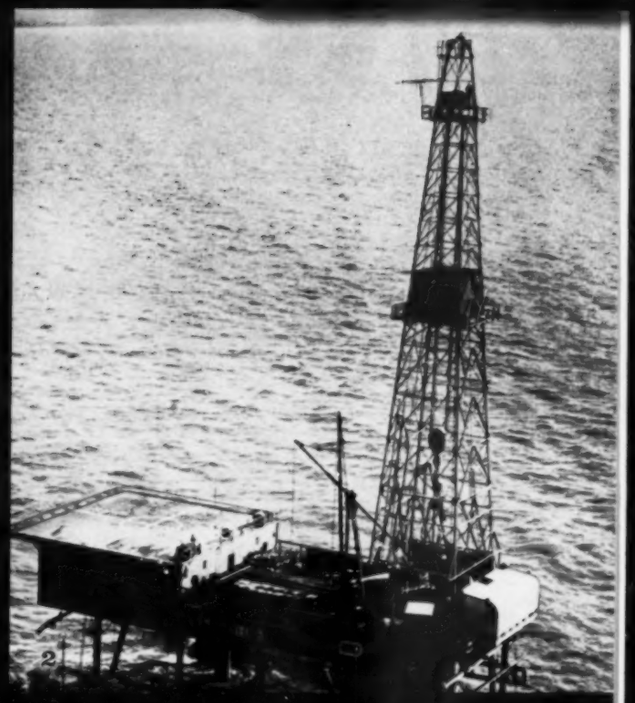
Name_____

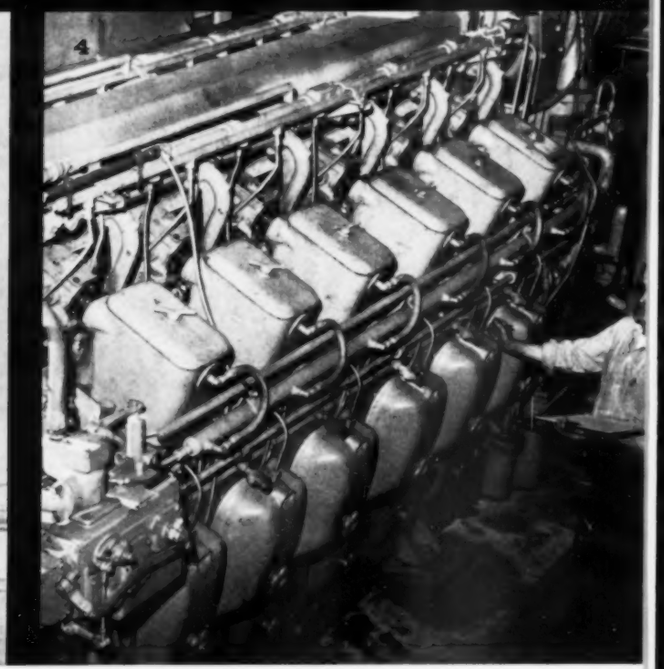
Title_____

Company_____

Address_____







THE NEW BIG MUSCLE IN DIESELS

Around the world—in all kinds of tough diesel-power jobs—ALCO's 251 diesel engine has proved that it delivers the versatility, economy and stamina needed for profitable operations. Here are a few examples:

1. Microwave signals from 100 miles away direct an ALCO six-cyl 251, pumping liquid petroleum products on a Kansas pipeline. After two years of remote operation—8000 total hours—an inspection revealed the engine could run at least twice as long without overhaul.

2. Three 251's power a large offshore drilling platform. The operator reports that fuel consumption is much lower than competitive engines, while the 251's controllability allows him to speed up costly drilling operations.

3. Tugboats like the *Savannah* use 16-cyl 251's to get power for heavy tows on high seas. Operators report low maintenance, with three to four years' operation before overhaul. The 251's fuel consumption—15 per cent less than competition—permits longer tows.

4. A steel company uses an ALCO 251 as standby, pumping cooling water to open hearths. Recently, during a power stoppage, the 251 assumed the whole pumping load, saving thousands of dollars of furnace damage.

ALCO 251's—available in inline six, vee 12 and 16, from 900 to 2400 hp—are your best investment. For more information, call your ALCO sales office, or write: ALCO Products, Inc., Dept. 1201, Schenectady, N. Y.

ALCO PRODUCTS, INC., New York · Sales Offices in Principal Cities · Makers of: *Diesel Engines Weldments · Locomotives · Nuclear Reactors · Heat Exchangers · Springs · Steel Pipe · Forgings · Oil Field Equipment*

ALCO

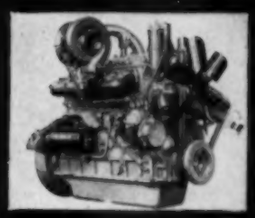
SCHWITZER TURBOS

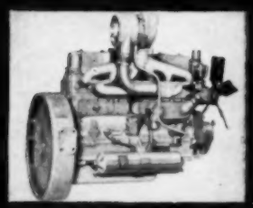
Best For Your Operation

MOST HOURS IN THE FIELD

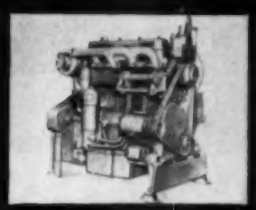
GREATEST NUMBER IN OPERATION

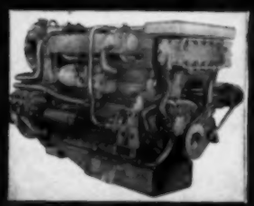
BEST INSTALLED PERFORMANCE





OPERATORS SAY





CALL ON SCHWITZER FOR THE EXPERIENCE OF MORE AND VARIED PRODUCTION INSTALLATIONS

SCHWITZER
CORPORATION
INDIANAPOLIS, INDIANA

FANS DAMPERS PUMPS SEALS SUPERCHARGERS MODULATED DRIVES AIR MOTORS

Net result: 3,000,000 pounds of fish a year

The Terra Nova is a steel, diesel fishing trawler owned by the Westerbeke Fishing Gear Co. The 110 foot vessel operates out of the Boston Fish Pier, the largest such pier in the world. The 30 trips that the Terra Nova makes each year last about ten days each. Although quite capable of ranging the entire North Atlantic, most trips are made along Georges Banks, 250 miles out to sea. The average catch for each trip is 100,000 pounds of deep sea fish, which adds up to 3,000,000 pounds a year.

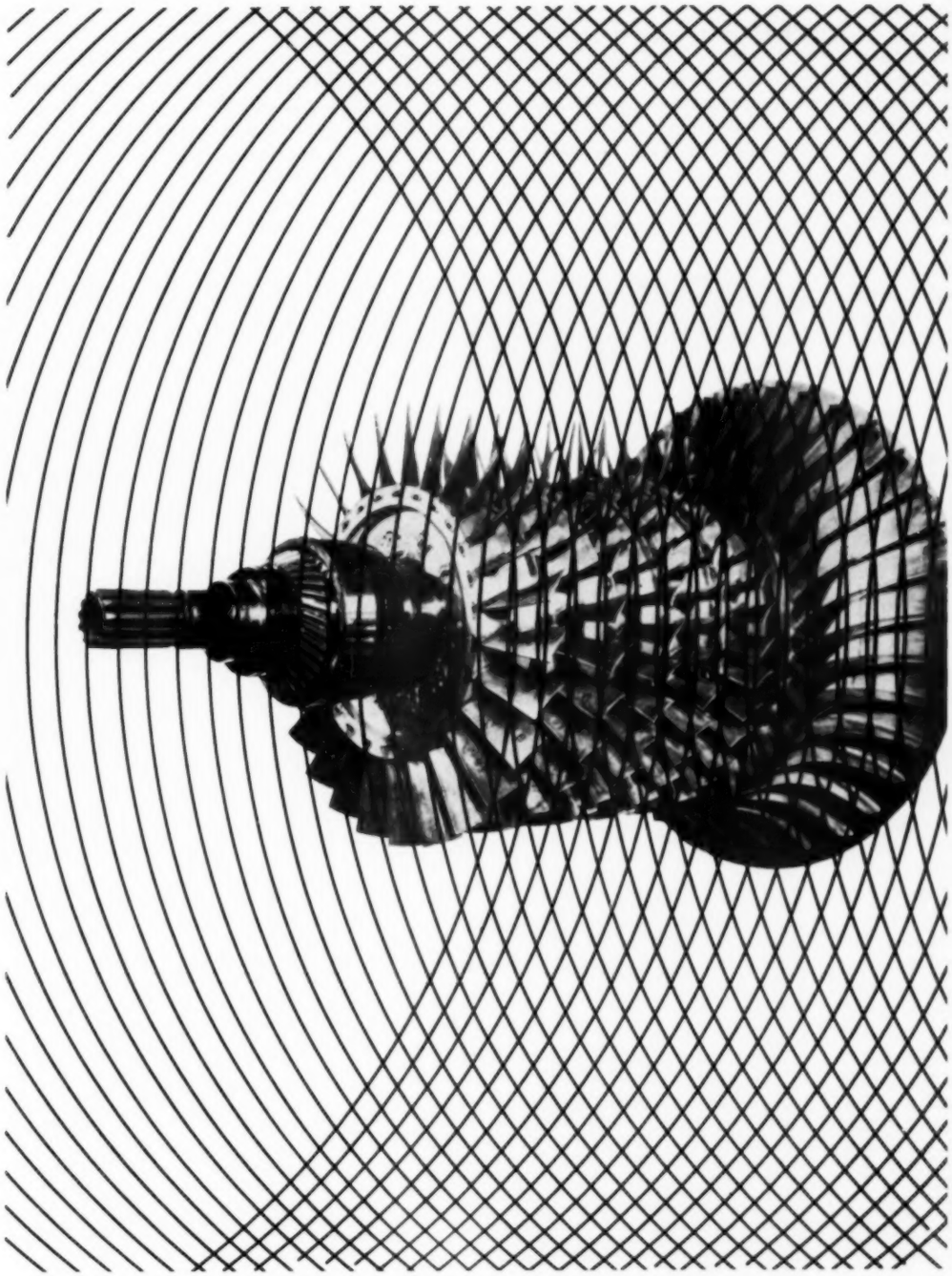
Four years ago the Terra Nova started using Cities Service C-300 Motor Oil and her Chief Engineer, Herbert Messenger says, "These engines get quite a workout. They run continuously from start to finish of every trip. Thanks to C-300 they haven't needed an overhaul in two years. This oil really keeps an engine clean. Rings don't stick and filters last 40 percent longer. We used to clean exhaust ports after every trip. With C-300 they go four trips before cleaning is necessary."

To find out how C-300 Motor Oil can improve the operation of your diesels, call your local Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

GETTING THE FACTS—Chief Engineer Herbert Messenger discusses lubrication of the Terra Nova's 550 horsepower engines with William D'entremont, Cities Service Lubrication Engineer.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS



Lycoming's T53: 1000 horses ride the earth, sea and sky.

Compact and rugged, the T53 gas turbine engine packs a roaring 1000 horsepower. Its versatility is amazing: not only does the T53 power aircraft, but it is adaptable to industrial and marine use as well. It is a product of Avco's Lycoming engineers who are shaping a new age of power for America.

VISIT THE LYCOMING EXHIBIT AT THE ASME GAS TURBINE POWER CONFERENCE, BOOTHS 14-15; THE RICE HOTEL, HOUSTON, TEXAS, MARCH 6-9

Lycoming

LYCOMING DIVISION / *Avco* CORPORATION / STRATFORD, CONN.

Expands American Company

Hawker Siddeley has announced the expansion of its American company. The group's industrial products, previously sold through Orenda Industrial Inc., a member of the group's Canadian organization, A. V. Roe (Canada) Ltd., will in future be marketed through Hawker Siddeley Brush Inc. from their offices and warehouse at Woodside 77, Long Island, New York. The new company is a member of the Hawker Siddeley Group and has representatives in San Francisco and Chicago. The small engine division will maintain its distributor and dealer organization and is extending its range of locally assembled products many of which were exhibited at the National Boat Show at the New York Coliseum on January 13th. President of the new company is M. C. Clear who is the managing director of Hawker Siddeley Brush International Ltd. and the vice-president is J. P. Bond, previously a vice-president of Orenda Industrial Inc.

Payhauler Catalogs

Catalogs of the model 95 and model 65 Payhauler rear dump, off highway trucks are featured in two 16 page catalogs just issued by the International Harvester Co. Both models feature a rock-ribbed corrugated body design which is said to trim gvw by 5,000 lbs. Power for the 27 ton capacity model 95 is furnished by International's DT-817, six cylinder diesel unit rated 375 hp at 2100 rpm. The model 65, with 19 ton capacity, is powered by the D-817, rated 250 hp at 2100 rpm. Other features described in the Payhauler catalogs include the power train, main frame and support members, Torqmatic brake, enclosed power steering system and operator-designed cab. The catalogs, CR-743-I for the model 95 and CR-744-I for the model 65, are available from International Harvester Co., 180 N. Michigan Ave., Chicago 1.

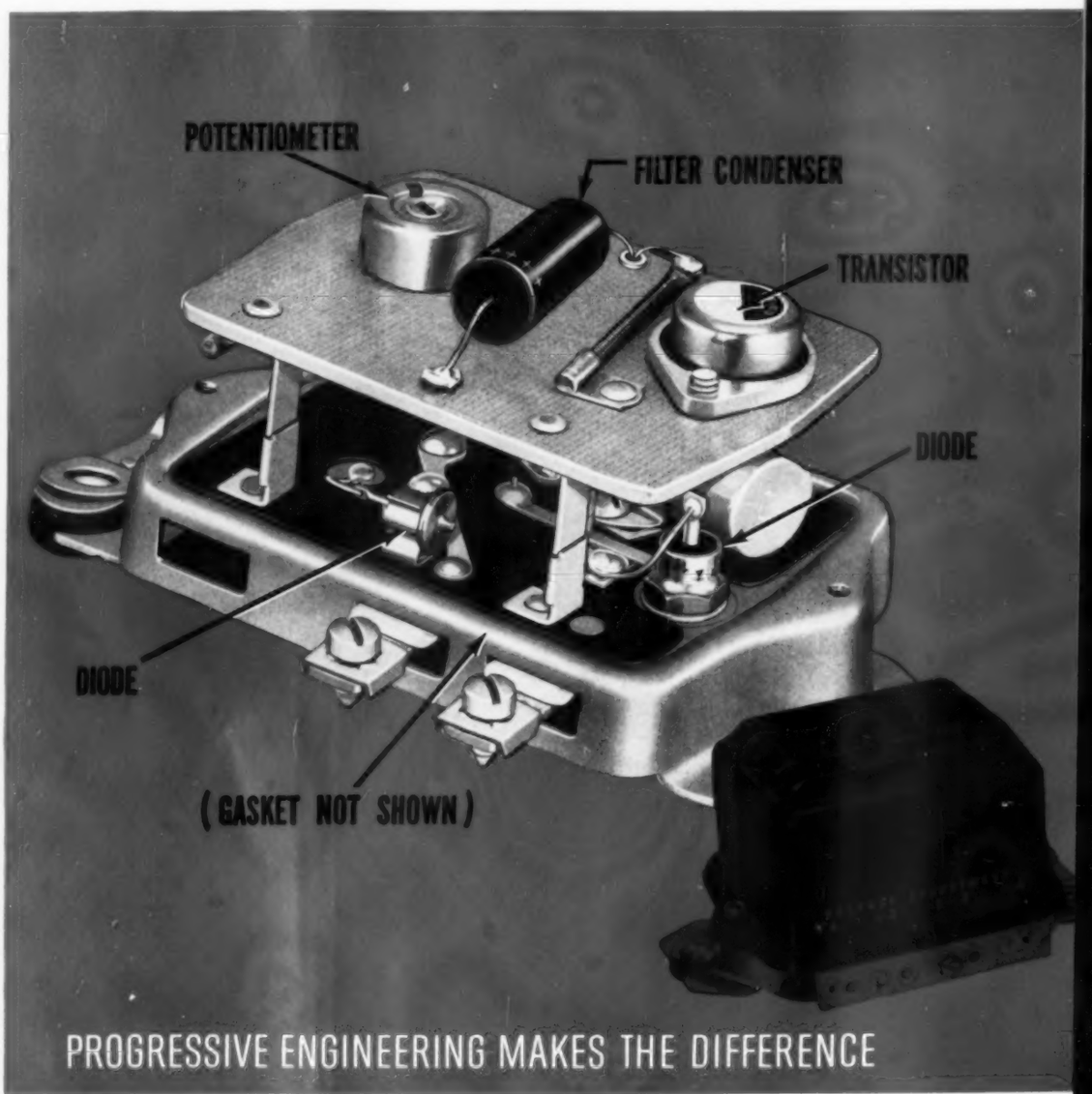
ITS NEW

Radioisotope Test Methods

With availability and knowledge of radioisotopes increasing every day in American industry, it is only a matter of time before ASTM adopts standards and test methods for their use. The Symposium on Applied Radiation and Radioisotope Test Methods at the ASTM 3rd Pacific Area National Meeting in San Francisco, October 12-16, was held to focus attention on several procedures using radioisotopes that might be adopted as ASTM standards. Much discussion centered on a program of radioactive ring wear testing in diesel locomotives sponsored jointly by the Southern Pacific Co., the Standard Oil Co. of California, and the California Research Corp. Irradiated piston rings were installed in the engines of several Southern Pacific diesel locomotives. The radioactivity of the lubricating oil due to ring wear was measured in a counting well with Geiger-Muller tubes. This procedure has proved to be an excellent tool for investigating a wide variety of factors that influence ring wear in diesel locomotives.

White Jacksonville Manager

H. C. Godden, The White Motor Co. transportation expert who has more than 36 years' experience with the Cleveland truck firm, has been named manager of the company's new White Truck Division branch at Jacksonville, Fla. Godden will manage sales, parts, and service operations of both White and Autocar trucks at the newly-established branch. Godden's experience with White dates back to June 18, 1923, when he joined the company as a technical apprentice following his graduation from Carnegie Institute of Technology. More than 20 years of Godden's outstanding service to White has been spent as a sales, district, or territory manager and in branch operations.



PROGRESSIVE ENGINEERING MAKES THE DIFFERENCE

ONLY DELCO-REMY OFFERS FULL-TRANSISTOR

Designed for use with DELCO-REMY'S new self-rectifying a.c. generators

Now you can choose between *two* modern new Delco-Remy regulators—the most accurate available today. One is a full-transistor model, the other transistorized.

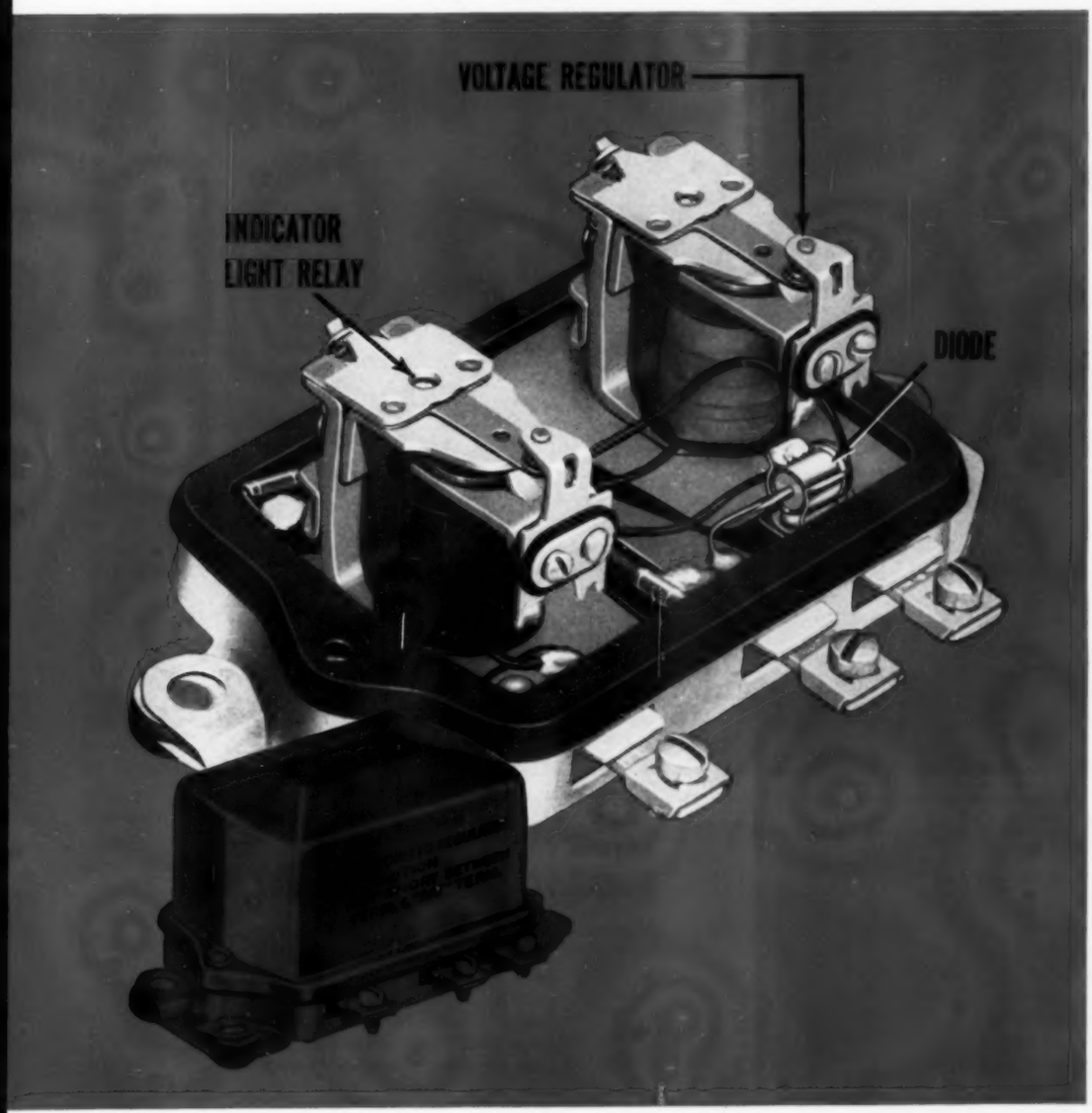
The FULL-TRANSISTOR REGULATOR has no moving parts and offers the ultimate in accurate electrical performance, durability and reliability. It is composed entirely of transistors, diodes, condensers and resistors, permitting higher field current for better generator performance. Constant voltage control is unaffected by temperature changes, vibration, or mounting position. A simplified external adjusting feature permits easy voltage setting for varying operating conditions. And this full-transistor regulator requires no periodic servicing.

The TRANSISTORIZED REGULATOR contains a single transistor and diode working in conjunction with a vibrating-type voltage sensing unit. The transistorized circuit

New Bendix Filter Element Series

A new series of reservoir filter replacement elements, in three sizes of four different filter media with micron ratings from 2 to 100, is now available from the Bendix Filter Division of Bendix Aviation Corp., Madison Heights, Mich. Series 6236 reservoir replacement elements are lightweight filters designed to protect cylinders, pumps, valves and other closely fitted parts in hydraulic systems. The three available sizes all have an outside diameter of 6 in. with lengths of two, four and eight in. Two or more elements of the same or different sizes can be stacked in modular fashion in a single housing to meet flow requirements. All Series 6236 elements have pleated media for maxium flow rate and contamination capacity within a given volume. These elements conform in sizes and configuration with AN 6236 specifications. Series 6236 elements are available for use with Skydrol type fluids. The new replacement element series offers a wide range of micron ratings in four different media: micropleat (5 to 40 microns); micromesh (5 to 100 microns); and microbon (40 microns). Micropleat elements contain pleated resin-impregnated cellulose fiber sheet material that is Pliobond or epoxy bonded to aluminum end caps for temperatures from minus 65F to plus 275F. This element is qualified under MIL-F-5504A. Poromesh elements have pleated sintered wire cloth media that is silver soldered (minus 350F to plus 350F operation) to stainless steel end caps or epoxy bonded (minus 65F to plus 275F) to aluminum end caps. Micromesh elements are the same as Poromesh except the wire cloth is not sintered. Microbon elements are made of a wound ribbon of resin-impregnated cellulose material bonded to aluminum end caps with Pliobond (minus 65F to plus 275F).

ITS NEW



AND TRANSISTORIZED VOLTAGE REGULATORS

permits high field current for improved generator performance with low non-inductive current through the contacts for greatly extended contact life. Models are available for circuits containing either ammeters or indicator lights. All units are temperature compensated to better match battery voltage requirements.

Both the full-transistor and the transistorized models have the same mounting dimensions as standard regulators.

Whichever model you choose for your new vehicles or for replacement on present ones, you can be sure of reduced servicing and extended battery life. Available from your car or truck dealer or through the United Motors System.

FROM THE HIGHWAY TO THE STARS

Delco-Remy

ELECTRICAL SYSTEMS

DELCO-REMY • DIVISION OF GENERAL MOTORS • ANDERSON, INDIANA

New Compressor Bulletin

A new bulletin presents the turbocharged, redesigned line of Clark HRA-T gas-engine-driven compressors. Fully described and illustrated are the crankcase, bed section, pistons, crossheads and running gear, all of which have been made heavier and more massive to handle the additional horsepower developed from turbocharging. Other features presented include the new Clark automatic jet-air started turbocharger, aluminum precision bearings, dry insulated manifold, high efficiency scavenging air intercooler and accessible in-line design. The brochure contains complete specifications and dimensions of this 14 x 14 in. bore & stroke machine, built in four, five, six and eight cylinder models with horsepowers ranging from 660 to 1320 bhp. Copies of Bulletin 179 can be obtained by writing to Clark Bros. Co., Olean, N.Y.

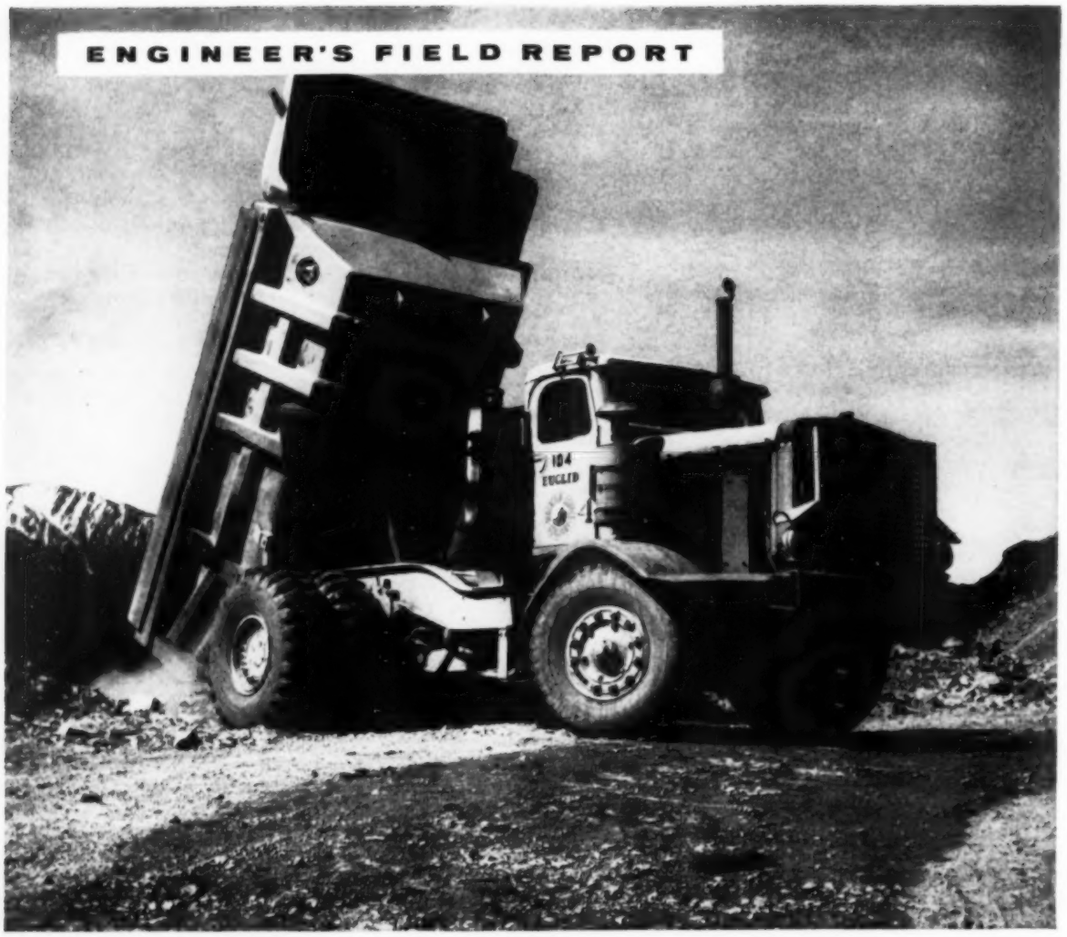
ITS NEW

Winslow Controller

James D. Bingham has been appointed controller of Winslow Engineering and Manufacturing Co., Oakland, manufacturers of industrial filters. In his new post Bingham will supervise financial affairs of the Winslow head office in Oakland, as well as offices in Murray, Ky. He is a member of the National Association of Cost Accountants, the American Management Association and the Credit Managers Association.

Cooper-Bessemer Appointment

David K. Goff has been transferred to The Cooper-Bessemer Corp.'s Houston branch office as a sales engineer. In his new post, Goff will work under the immediate supervision of Earl P. Martin, Houston branch manager, on the application and sale of compressors and engines in that area. Since 1957, he has been assigned to the sales department at the company's headquarters in Mount Vernon, O.



25-ton payloads . . . yet off-highway trucks average 4 to 6,000 hours before overhaul

For the past four years, six Euclid 36 TD dump trucks have played a key part in Mountain Copper Co. of California's open-pit mining operations near Redding. Using RPM DELO Supercharged #3 Oil, this fleet has already worked more than 40,000 hours without a lubricant failure.

Operating conditions are tough for the "Eucs"; put a real strain on their engines. Hauling iron pyrite ore to the crusher plant and removing waste (above), they must travel loaded down 7% grades. Payloads range up to 25 tons . . . dust is thick . . . and temperatures reach 105° for six months of the year. Despite all this, the trucks work from 4,000 to 6,000 hours before engine overhaul.

"We have no wear problems at all using RPM DELO Supercharged #3," says Master Mechanic Ben Jacklin. "Never had any lubrication trouble in any engine using it. The oil's done an outstanding job in our equipment."

RPM DELO Oils reduce wear and prolong engine life because they cling to parts whether the engine is running or idle. Anti-oxidant fights gum and lacquer formation, special detergent keeps parts clean. Other additives prevent corrosion, crankcase foaming.

Why not try RPM DELO Oils? Let them cut your costs, lengthen equipment life. Just call your local representative, or write any company listed below:

RPM DELO

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey

STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA COMPANY, Denver, Colorado

TRADEMARKS "RPM DELO" AND CHEVRON DESIGN REG. U.S. PAT. OFF.

HOUSTON GAS TURBINE MEETING INTERNATIONAL IN SCOPE

ASME Conference on March 6-9 Will Feature New Developments. Exhibits and Program Slanted Towards Operating Experience and Applications in Various Industrial Fields; Capsule Report of Planned Exhibits is Given Here

NEW developments in gas turbines and accessory equipment, attractive exhibits and an excellent program highlighted by many foreign papers is the combination that sets the stage for the 56th Annual ASME Gas Turbine Power Conference which will be held in the Rice Hotel, Houston, Texas, March 6-9, 1960.

Full significance of the meeting is gained from this statement from J. H. Anderson, chairman executive committee, Gas Turbine Power Division. "It is particularly appropriate, and no accident that the Conference is to be held in Houston. Only ten short years ago the first industrial gas turbine went into service in Arkansas. From that single and successful beginning the use of the industrial gas turbine has so expanded that today we can say that the Southwest is truly 'The Land of the User'.

"This conference will give an excellent opportunity for the engineers who are actually operating gas turbines to get together in their own territory, with the people who design, build, and sell gas turbines. The whole program is slanted toward actual operating experience and application of gas turbines in various industrial fields. The exhibits will also be most useful and educational in presenting the newest ideas in gas turbine machinery to the eyes of those who are best qualified to understand and evaluate them in actual service.

"We are very fortunate this year in having a number of foreign papers presented, which will add greatly to gas turbine operating and application knowledge. This will give an international flavor to the conference. The conference this year will be greatly enhanced by having the concurrent Hydraulics Division conference associated with it at the same place. Many of the papers given are directly associated with gas turbine design and operation, particularly those on compressors. Compressors and pumps also provide many of the applications for gas turbines."

The list of exhibitors, while not complete at date of publication, shows 25 participating manufacturers including all major gas turbine builders and many of the principal accessory equipment suppliers. Here in this special Gas Turbine Progress Report is a capsule look at what the turbine builders will be featuring:

Allison Division, General Motors—Allison will display its GMT-305 Whirlfire gas turbine engine which is rated 225 hp for vehicular service and weighs 650 lbs. The '305 is built to burn a wide variety of fuels. It is equipped with rotating, self cleaning regenerators which according to Allison are 90 per cent effective in recovering exhaust heat. The GMT-305 is 31 ins. wide, 26 ins. high and 36 ins. long.

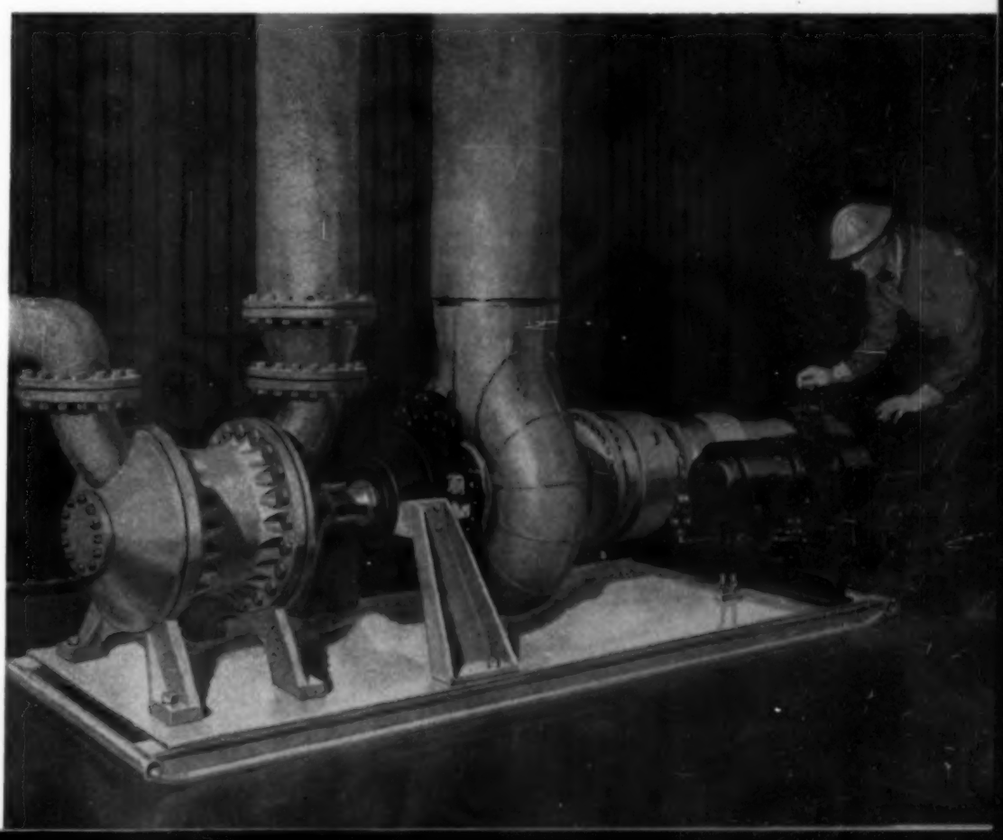
Boeing—Cutaway versions of Boeing gas turbines in the 502 and 520 series covering the power ranges from 250 to 600 hp will be on display. The 502-10MA turbine, available by mid-1960, is rated at 300 hp for continuous duty and the 520 turbine engines are now developing over 500 hp. Boeing representatives attending the conference include B. Karther, W. St. Germain and G. A. Cashman.

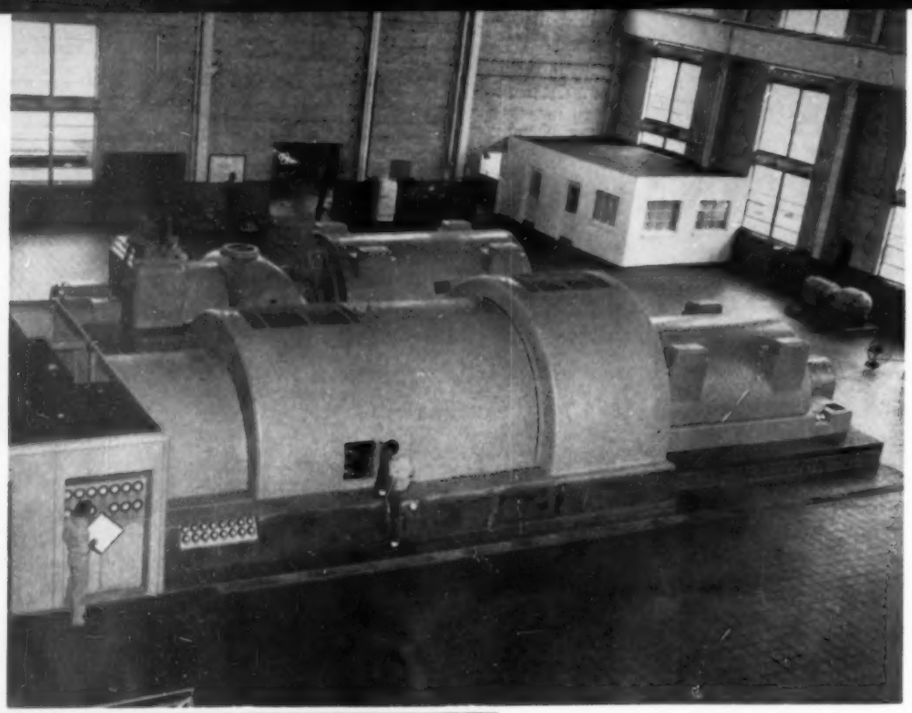
Brown Boveri—Many of Brown Boveri's more interesting gas turbine installations will be depicted in pictures and literature and a special feature of the exhibit will be a large scale model of a blast furnace gas-fired turbine driving a furnace blower. Useable power of the full scale machine which is installed in Europe is 15,000 kw. Mr. Z. Stanley Stys, vice president in charge of Brown Boveri's mechanical division is program chairman of the Houston gas turbine meeting and he will be joined in the Brown Boveri exhibit by Paul R. Sidler, president, and several engineers and specialists.

Clark—Clark Bros. exhibit will feature its new model 305-S single-shaft gas turbine rated 9000 bhp. This turbine is very similar to Clark's present 302 and 305 dual shaft gas turbines except for the single shaft feature. It is of the open cycle type and is suited for driving centrifugal compressors, generators, pumps or other loads of this type. It can be furnished with gear sets to provide required output speeds.

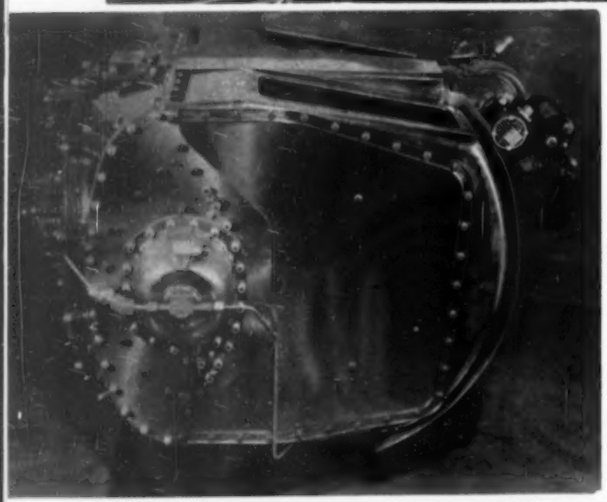
Cooper-Bessemer—In its exhibit Cooper-Bessemer will display a ¼ scale model of its new RT-248 gas turbine which combines the Pratt & Whitney J-57 jet engine with a power turbine to produce 10,500 hp at 5000 rpm. The cutaway model will be enclosed and shown rotating. Another feature of the display will be large mural depicting the first installation of the RT-248 in the Clementsville, Ky. station of Columbia Gulf Transmission

Solar's new centrifugal gas compressor, left, is shown here coupled to a T-1000 Saturn gas turbine engine for pipeline compressor station use. The new compressor line will operate from 75 to 1000 inlet cu. ft./min. at up to 1500 lbs. of pressure. Total weight of the 1100 hp turbine and the compressor is approximately 5000 lbs.



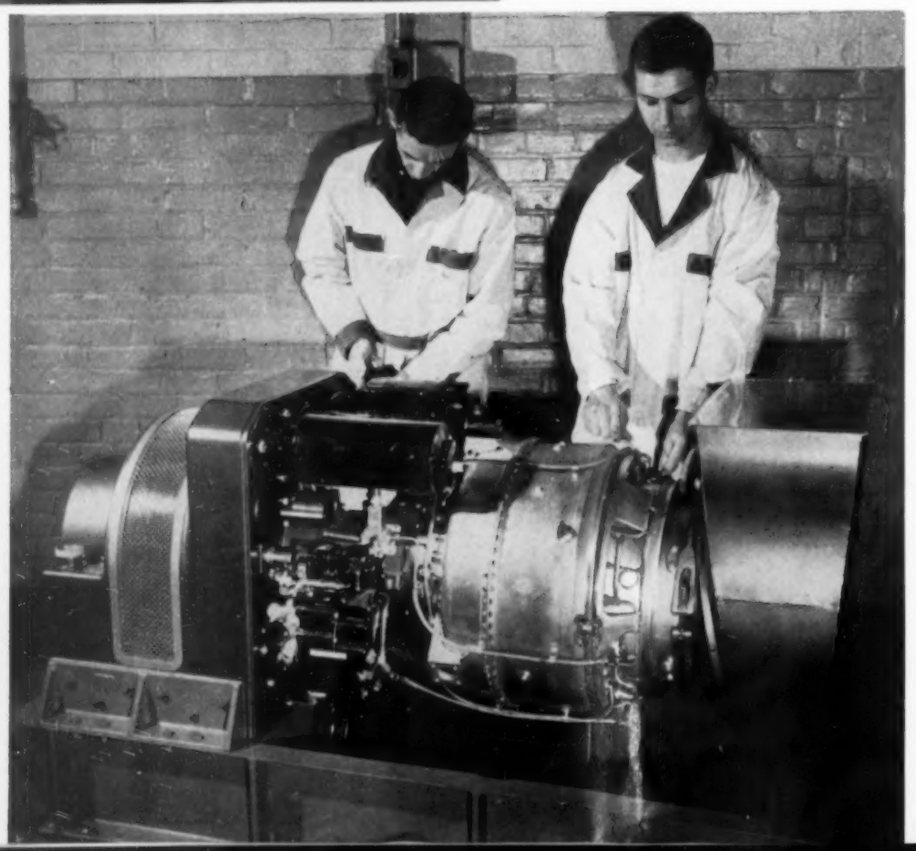


Elevated side view of General Electric 16,760 kw gas turbine at Florida utility plant.



Allison's GMT-305 Whirlfire gas turbine engine rated 225 hp.

900 maximum hp. Lycoming T53 gas turbine packaged unit has a total weight, with 3000 rpm output, of 1250 lbs.



Co. Also expected ready for distribution at the show will be a new bulletin on the Cooper-Bessemer gas turbine engine.

Garrett—Several models of the line of Garrett gas turbines which range from 30 hp to 850 hp will be displayed. These turbines cover a wide range of applications in military, commercial and industrial service and are available for driving generators, compressors, pumps, etc. It is expected that Garrett will display its GTP30-1 lightweight 30 hp gas turbine power unit as well as its new test stand for commercial air turbine starters.

General Electric—Four General Electric Co. Departments—The Aircraft Accessory Turbine, Small Aircraft Engine, Gas Turbine, and Small Production Engine—will exhibit. The Gas Turbine Engine Department display will include typical models and photographs of General Electric equipment as applied in the utility, oil, fuel transmission, and petro-chemical industries. These units range from 5000 to 25,000 kw or 5000 to 35,000 hp.

Lycoming—A special feature of the Lycoming exhibit will be a packaged T53 industrial and marine engine with a maximum power rating of 900 hp and a continuous rating of 700 hp. The packaged unit is completely self contained and offers comprehensive selection of power take-offs and application features. Total weight with 3000 rpm output is 1250 lbs. Also on display will be standard versions of the T53 and T55 gas turbines. Mr. Kenneth Austin will be in Houston and in charge of the exhibit.

Solar—A new Solar gas turbine–driven centrifugal compressor for industrial applications will be the feature of their exhibit. The compressor, which is designed to operate in the low volume-high pressure range, will be coupled to a Solar T-1000 gas turbine engine. In addition, various turbine components and applications will be shown. Included in Solar's line is the 80 hp Titan, 50 hp Mars, 600 hp Jupiter and 1250 hp Saturn.

Westinghouse Electric Corp.—In its exhibit Westinghouse will focus attention on its range of gas turbine power plants, both stationary and mobile. The display itself will show gas turbines as they are applied to natural gas transmission, oil field repressurization, electric power generation, chemical and petrochemical plant services. In charge of the exhibit will be Charles J. Burke, gas turbine sales manager, and he will be joined by engineering officials from the company's Pittsburgh plant.

Here is the official published program for March 7-9. Inspection trips to nearby gas turbine installations are planned for March 10 and 11 and these will be announced at the meeting:

MONDAY, March 7th

8:30 A.M.—Exhibits Open.

9:00 to 11:30 A.M.

Gas Turbine Division Session No. 1

"Operation and Maintenance of Remotely Controlled Gas Turbine Units"
by Ross C. Hill, Trans-Arabian Pipeline Co. Beirut, Lebanon

"Comparison of Operating Characteristics of a Dual Shaft Gas Turbine With a Single Shaft Gas Turbine for Gas Line Pumping"
by Mark J. McDonough, Westinghouse Electric Corp., Philadelphia, Pa.

"Operating Experience on Nimonic 80A First Stage Turbine Buckets on Natural Gas"
by A. W. Herbenar and G. R. Heckman, General Electric Co., Schenectady, N. Y.

Joint Session No. 1

Symposium on Compressor Stall, Surge and System Response—I.

Hydraulic Division Session No. 1

Prime Movers I.

11:30 to 12:30 P.M.—COCKTAILS IN EXHIBIT HALL

12:30 to 2:30 P.M.—WELCOMING LUNCHEON

2:30 to 5:00 P.M.—

Gas Turbine Division Session No. 2

"Application of Gas Turbines in Industry"
by C. R. Apitz, Clark Brothers Co.

"Report on 9000 Hours Operation of Marine Propulsion Gas Turbine in the JOHN SERGEANT"
by C. C. Tangerini, U. S. Maritime Administration, Washington, D. C. and W. H. Van Cott, United States Lines, and H. D. McLean, General Electric Co., Schenectady, N. Y.

"1,100 HP Gas Turbine for Marine Application"
by Paul A. Pitt, Solar Aircraft Co., San Diego, Calif., and Cdr. R. G. Mills, Bureau of Ships, Washington, D. C.

Joint Session No. 2

Symposium on Compressor Stall, Surge and System Response—II.

Hydraulic Division Session No. 2

Prime Movers II.

6:30 P.M.—Exhibits Close.

7:30 to 9:30 P.M.

Joint Session No. 3

Symposium on Compressor Stall, Surge and System Response—III.

TUESDAY, March 8th

8:30 A.M.—Exhibits Open.

9:00 to 11:30 A.M.

Gas Turbine Division Session No. 3

"Gas-Steam Power Generation"
by P. T. Martinuzzi, Prof. of Mech. Engrg., Stevens Institute of Technology

"Economics of the Combined Steam Gas Turbine Exhaust Heat Cycle for Medium Size Electric Utilities"
by Warren M. Sybert, Kaiser Engineers, Oakland, Calif.

"Heat Recovery from Gas Turbine Exhaust"
by G. L. Morris, Brown & Root, Inc., Houston, Texas.

Hydraulic Division Session No. 3

Water Hammer I.

Hydraulic Division Session No. 4

Fluid Mechanics I.

11:30 to 12:30 P.M.—COCKTAILS IN EXHIBIT HALL.

2:30 to 5:00 P.M.

Gas Turbine Division Session No. 4

"Operating Experience with a 15MW Blast Furnace Fired Gas Turbine in a German Steel Mill"
by F. K. Koenig, Director
Huettenwerk Rheinhausen, Germany

"Three Years' Operating Experience with 7,500 Kw Gas Turbine Plants in Belgian Steelworks"
by E. Aguet and J. de Salis, Sulzer Brothers, Ltd., Switzerland.

Hydraulic Division Session No. 5

Cavitation Symposium I.

Hydraulic Division Session No. 6

Fluid Mechanics II.

6:00 P.M.—COCKTAILS

WEDNESDAY, March 9th

8:30 A.M.—Exhibits Open.

9:00 to 11:30 A.M.

Gas Turbine Division Session No. 5

"Experience with Gas Turbines in French Power Stations"
by Dr. P. Chambadal, Electricite de France, Paris, France.

"Gas Turbine Operating Considerations and Experiences at El Convento"
by O. H. Pfersdorff, Electricidad de Caracas, Caracas, Venezuela.

"A Rapid Starting Automatic Gas Turbine Generating Plant for Peak Load Duty"
by B. G. Markham, Bristol Siddeley Engines, Ltd., Bristol, England.

Joint Session 4.

Compressor I.

"Compressor Performances Evaluation with Complex Gas Mixtures"
by F. W. Peterson, M. W. Kellogg Company

"Correlation of Stage Performance with Different Test Fluids"
by F. Wiesner, Carrier Corporation.

"Correlation of Turbo Compressor Performance with Various Gases"
by C. A. Macaluso, Worthington Corporation.

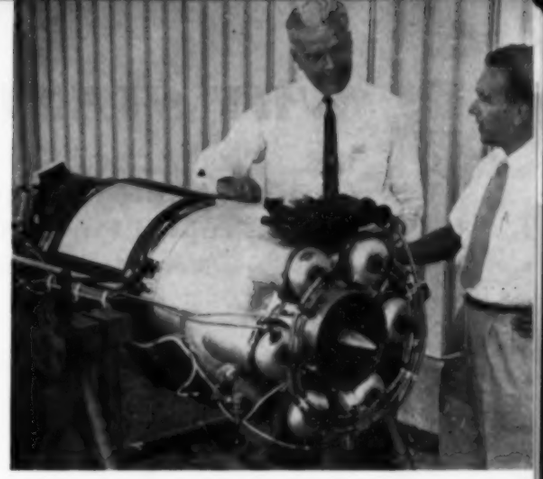
Hydraulic Division Session No. 7

Cavitation Symposium II

11:30 to 12:30 P.M.—COCKTAILS IN EXHIBIT HALL

12:30 to 2:30 P.M.—GAS TURBINE POWER DIVISION LUNCHEON

2:30 P.M.—Exhibits Close.



NEW gas turbine compressor being produced for Convair Fort Worth by AiResearch Phoenix will start two of the B-58's powerful J-79 jet engines simultaneously in less than 30 seconds and all four in less than a minute. AiResearch Phoenix sales manager Stanley Whitaker (left) and chief engineer Helmut Schelp examine the first of the turbines ordered by Convair. The unit in a shaft power configuration can produce 850 hp.

2:30 to 5 P.M.

Gas Turbine Division Session No. 6

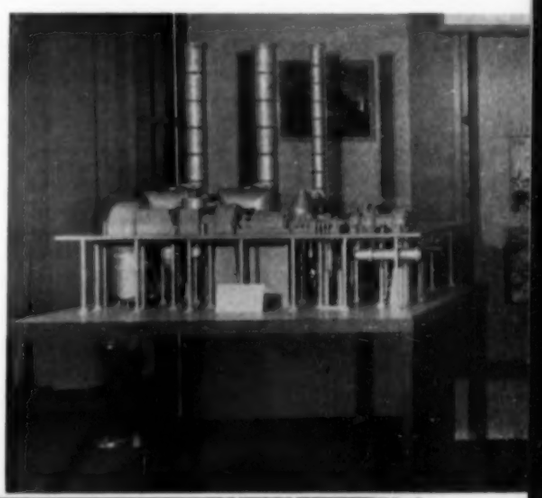
"The Behavior of Gas Turbine Combustion Chambers While Burning Different Fuels"
by C. Kind, Brown, Boveri & Co., Ltd., Baden, Switzerland.

"Smoke Reduction in Residual Fuel Burning Gas Turbine Combustion System"
by J. B. Gatzemeyer, R. B. Schiefer and N. R. Dibelius, General Electric Co., Schenectady, N. Y.

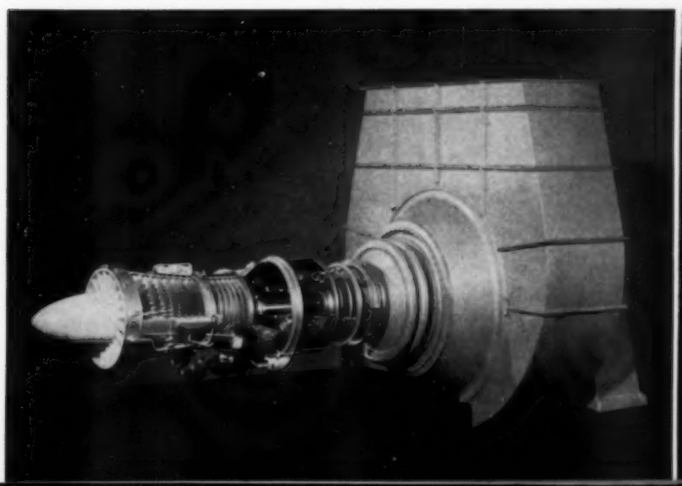
Hydraulic Division Session No. 8

Cavitation Symposium III

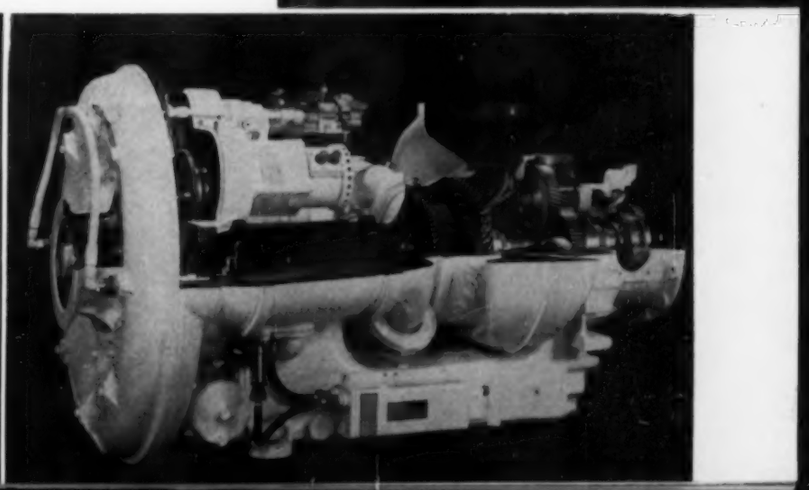
7:30 to 9:30 P.M.—Committee Meetings



Model of the Brown Boveri 15,000 kw blast furnace gas-fired turbine driving a furnace blower.



Scale model of the Cooper-Bessemer RT-248 gas turbine rated 10,500 hp at 5000 rpm.

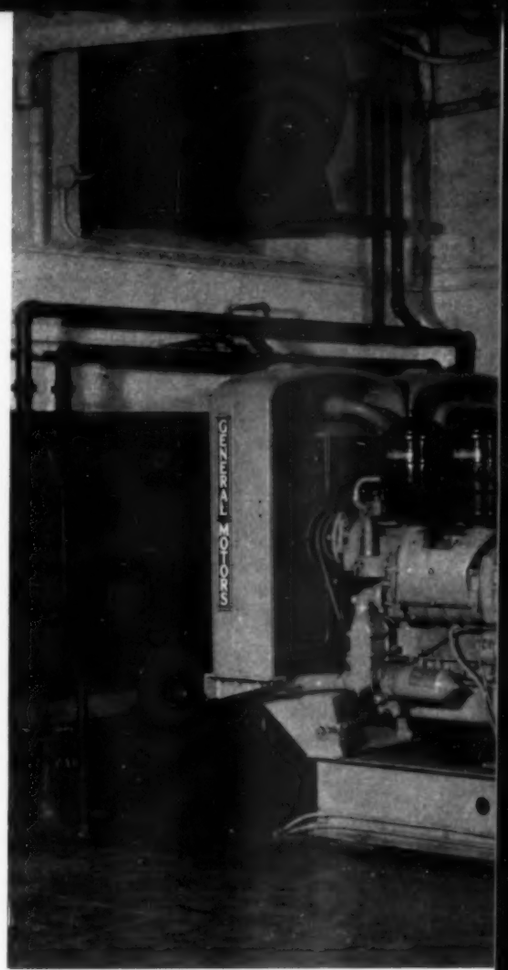


Cutaway view showing design characteristics of the Boeing gas turbine.

WHY STANDBY POWER?

Protection of Public, Manufacturing Processes Depend on Uninterrupted Power Supply: Story of "Metropolis" Dramatizes Need for Emergency Sets in Utility Outage

By JIM BROWN

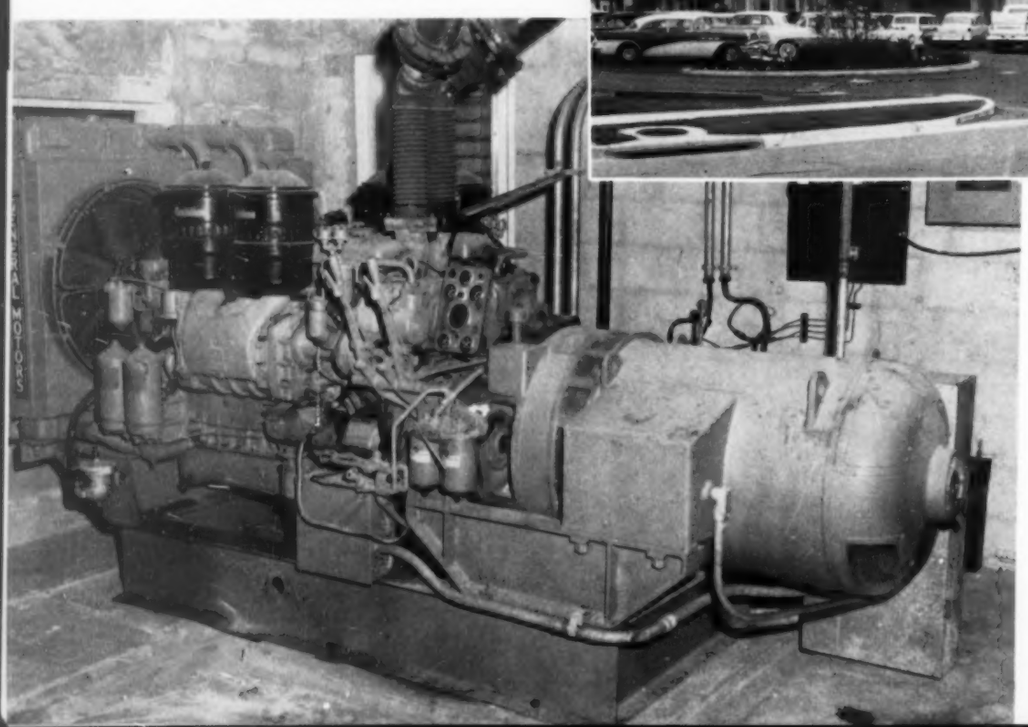


THE production of electrical power to meet the many needs of modern living is a marvelous achievement. The power companies, municipal plants, and, in some areas, our government-owned plants have all done a remarkable job in providing and in transporting electrical power to the exact spot where it is needed. We depend upon it heavily for processing, packaging and preserving our foods; for power to run the machines and furnaces in our plants and to heat our homes; for light to make our buildings safe by day and our streets by night; for communication by telephone, radio and television; for the operation of our traffic signals and fire alarms; to pump our water and dispose of floods . . . in many, many ways we are dependent upon this invisible but most important service. And yet, what is perhaps still more remarkable, is the way we take this service for granted, assuming that it will *always* be there, ready to take on any job we assign to it.

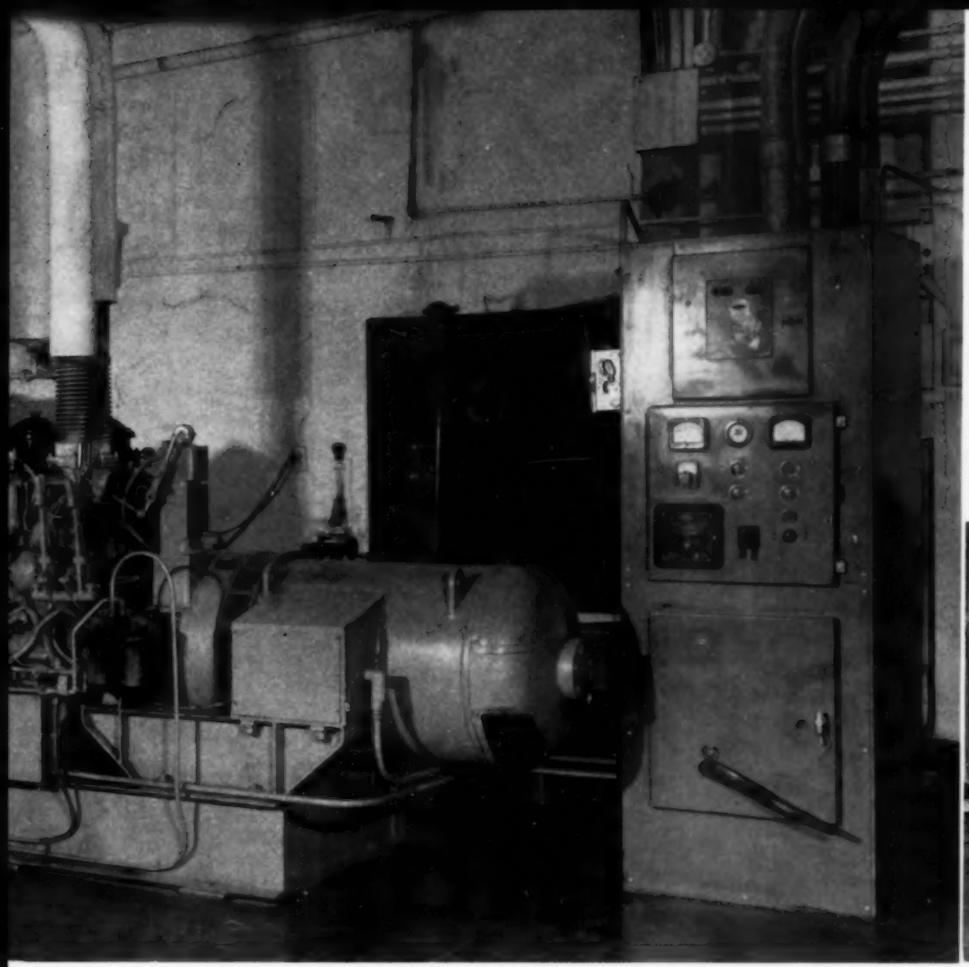
Providing us with this remarkable tool of modern civilization is a two-fold job. First, the electricity must be generated; then it must be carried over miles of territory to the point of ultimate use. This calls for a vast network of distribution: for high-voltage power lines leading in all directions from the generating plants, through sub-stations to the pole-mounted transformers in your neighborhood which reduce the power to a useable voltage.

What would happen if we were suddenly to be deprived of this unseen, but very necessary service? Of course the power companies have taken every possible precaution to prevent such a catastrophe, even on a small scale. They arrange for an exchange of power between stations and even between competing companies so that a failure at one source can usually mean only a minor, almost imperceptible interruption. This takes care of most emergencies at the *source*, but there is no possible way to provide for the failures that may be caused in the *transmission* of power by storm, fire or flood. We therefore have only two choices in the matter: we can continue to take uninterrupted electrical service for granted or we can face up to the contingencies which can (and do) arise. This involves taking steps to provide an al-

Beautiful Broward General Hospital at Fort Lauderdale, Fla. has emergency electrical power equipment in the form of a 200kw GM diesel standby generator set. Many other institutions in this area, including a Stevens Supermarket, the City of Hollywood incinerator, Howard Johnson's Miami commissary and Miami's station WPST-TV are similarly equipped.



This GM Diesel Twin 6-71, 200kw standby generator set, installed at Broward General Hospital in Fort Lauderdale, Fla., is similar to the diesel standby generator which took over the power needs of one "Metropolis" hospital during the emergency.



The GM diesel 200kw Twin 6-71 standby generator set which took over the power requirements of one "Metropolis" hospital, providing all essential services during the emergency.

Hospitals such as this one depend on diesel emergency standby generating sets to supply electrical power in case of a failure of service from the local utility. Sets power elevators, operating room lights and equipment and other facilities that must function at all times.

ternate, localized source of "standby" power for the protection of manufacturing processes and for the safety and well-being of the public, wherever they may be gathered in numbers.

As an example of what can happen in a community which is *not* protected sufficiently by standby power, we offer the previously untold story of what took place a couple of years ago in Metropolis, U.S.A. Of course the real name of the city is not "Metropolis", otherwise the story is factual.

What Happened in Metropolis?

Electrical power failures, as pointed out above, usually occur in the transmission system. Lightning may knock out a transformer; wind or sleet storms may cause a localized deprivation of power for a relatively short time. Or—unprecedented floods can wipe out transmission systems over a large area, as in the cases of the Stroudsburg, Pa., Torrington and Waterbury, Conn. disasters of 1955. However, in the Metropolis case, a whole city of over 500,000 population was deprived of electrical service for an hour and a half because of the unexpected explosion of part of the high voltage equipment and the subsequent malfunction of a circuit-breaker at the generating plant. "Shorting" of the transmission lines caused a heavy overload which put first one, then another big generator out of action. An interconnected plant went out as a result, and other power stations which were tied in to the system were unable to carry the big-city load.

At 8:50 a.m. on this particular morning, a man whom we will call Johnny Maro received an emergency telephone call. A polio patient's respirator had stopped, and Johnny was urged to hurry out and fix it. Johnny was the respirator serviceman in the area for the National Foundation for Infantile Paralysis and to him the first call was only routine. But before he got on his way, another call and another came in, and he soon realized that only something serious, such as a widespread power failure could cause all of these respirators to go out at the same moment.

Johnny had no time to ponder the cause. He got in touch with the state representative of the polio foundation, and arrangements were made to secure a number of small generator sets made by a local manufacturer. Between these and the help of fire department respirators, the time of panic for the polio sufferers was soon over, but not without many anxious moments.

Metropolis police were confronted with one of the biggest traffic snarls they had ever experienced. All traffic signals were out and traffic was practically at a standstill until enough police officers could be stationed at main intersections to get it moving again. In the homes, electric cooking, washing and clothes drying came to a sudden halt. TV sets and radios went off. In office buildings people were trapped in elevators between floors. In factories, machine tools ground to a shuddering halt.

Most hospitals in the area had to resort to makeshift ways to carry on their work. Surgeons in the midst of operations carried on with the aid of flashlights. Reserve blood supplies in the refrigerated blood banks were kept from spoiling by the use of ice. Patients in the need of moving had to walk or be carried from floor to floor. Electrical cooking, air-conditioning and X-Ray equipment were temporarily useless.

At one of Metropolis's large manufacturing plants, thousands of dollars worth of cutting tools and materials were ruined. At an aircraft plant, 24 hr. tests on critical equipment were interrupted and had to be started over. At another plant a full shift's production which depended upon high-temperature vats was lost.

Two outstanding exceptions noted in the Metropolis area were one of the hospitals which was protected by a standby diesel generator and the Bell Telephone Co. which was similarly protected. The hospital with the standby diesel generator hardly realized there was an emergency . . . Their 200 kw GM diesel standby generator took care of lights and power for all essential services, including operating rooms, delivery rooms, elevators, dumb waiters, office machinery and two portable X-Ray machines. The telephone company, in keeping with its policy all over the country, was kept in service by standby power equipment and was thereby able to service the flood of phone calls which resulted from the temporary power failure.

Why standby power? We think the experience of Metropolis, although of only a short duration, is sufficient answer. And since diesel standby power has so many advantages in safety of fuel storage and in dependability under adverse conditions, diesel standby generators are certain to be found in more and more instances as the need for them becomes understood.

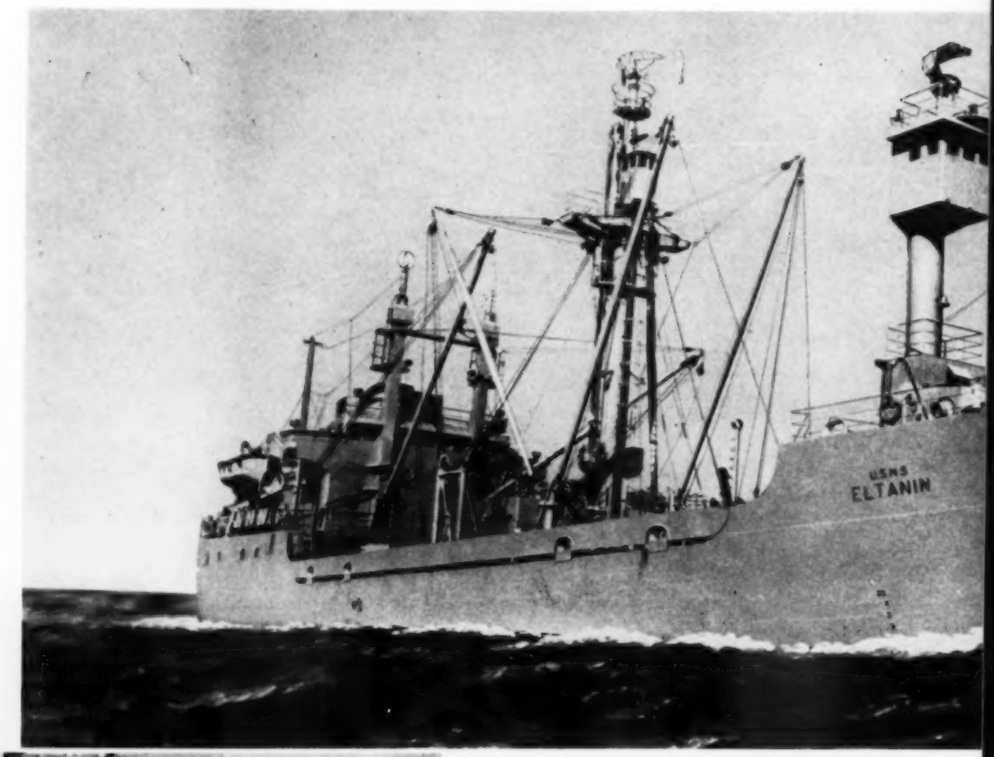
ICEBREAKING CARGO SHIP

Utilizing Diesels Throughout, USNS *Eltanin* Breaks Through Ice to Supply Polar Outposts; Vessel Is Diesel-Electric Propelled by Two 1600 BHP Alco Engines Driving Westinghouse Generators

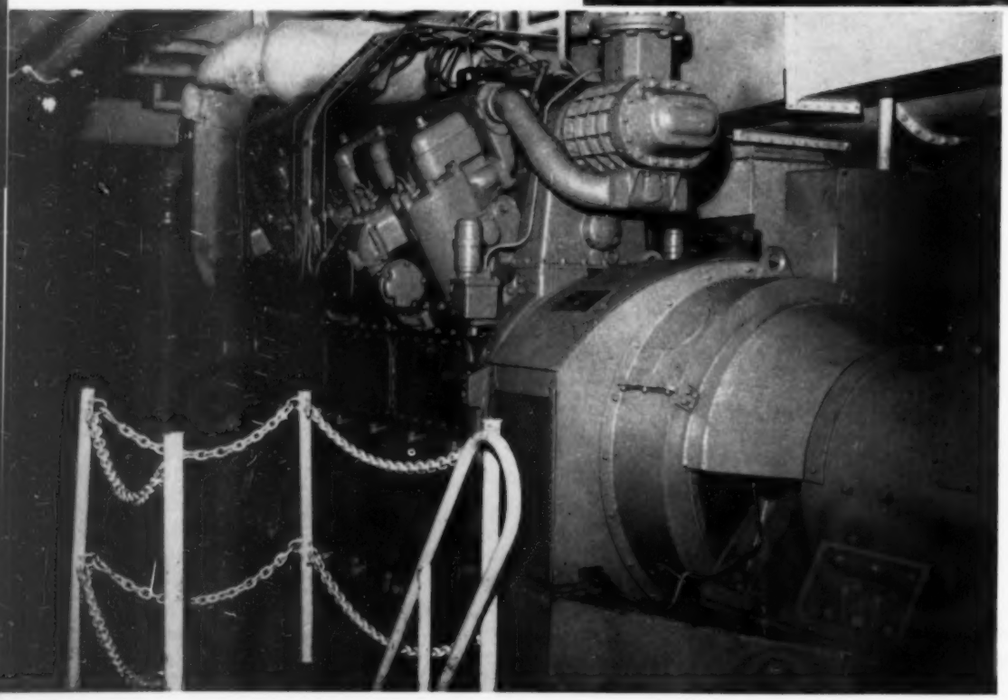
A cargo ship with icebreaking characteristics—that's the USNS *Eltanin*, the first of three such vessels built for polar voyages by Avondale Marine Ways, Inc., New Orleans, La. The *Eltanin*, which went into service about two years ago, utilizes diesels throughout—for main propulsion, ship-service and auxiliary power, as well as to power two lifeboats and a work boat. The *Eltanin* and its two sister ships of the Military Sea Transportation Service, known as the T-AK 270 class, supply polar region outputs.

Diesel-electric propulsion for the *Eltanin* is provided by two 1600 bhp Alco turbocharged model 251-B engines driving two 1100 kw, 900 volt generators which, in turn, supply power to double armature dc propulsion motors. Each of the two 1350 shp motors has its 450-volt armatures connected in series and is directly connected to one of the twin propellers. The *Eltanin's* sister ships, the *Mirfak* and *Mizar*, also have 251-B engines.

High tensile steel is used in the *Eltanin's* bow plating and ice belt. The bow is raked. The modified cruiser stern has an ice protection casting. The vessel has the general appearance of a small coastal freighter. It is of all-welded construction, has two continuous decks and a riveted gunwale bar at main deck. Overall length of the *Eltanin*



A cargo ship with icebreaking characteristics — that's the diesel-electric propelled USNS *Eltanin*.



This is one of the *Eltanin's* three ship-service diesel generator sets—a Caterpillar engine driving a Westinghouse generator.

is 266 ft. 2 in. Other statistics: length at waterline, 256 ft. 9 in.; breadth, 51 ft. 6 in.; molded depth, 26 ft. 5½ in.; draft, keel, 22 ft. 8¾ in.; light ship, 2036 tons; displacement, full load, 4942 tons; shaft horsepower, 2700; trial speed, 13 knots; deadweight cargo capacity, 2158 tons; bale cargo, 93,104 cu. ft.; refrigerated cargo capacity, 8330 cu. ft.

The *Eltanin's* two main Westinghouse propulsion generator sets have a maximum continuous rating of 2700 shp at 120 rpm for operation in ice—150 rpm for free route. Driving these generator sets are the two air-started Alco 251-B diesels, which are mounted on a base and block fabricated of strong, light weldments. The 251-B, rated 1600 bhp at 1000 rpm, is a 12 cylinder v-type engine equipped with a deep sump base that permits full lubrication under maximum list conditions. The engines have turbochargers and aftercoolers.

Of the two-wire, single-armature, split-frame type, each generator has a normal continuous rating of 1100 kw. The generators are shunt wound with separate excitation from the motor generator sets. The two propulsion motors, both Westinghouse, are the two-wire, double armature, split-frame type. Each is rated 1350 shp at 120 to 150 rpm. The propulsion motors are controlled from the main control board located in the engine room and from remote-control stands in the wheelhouse and ice-pilot station.

The *Eltanin* has three ship-service diesel generator sets and an emergency diesel generator, all installed on the upper level of the engine room. Two of the ship-service sets consist of 300 kw, 450 volt Westinghouse generators, driven by 500 hp, 1200 rpm Caterpillar engines. The other set is comprised of a 190 hp, 1200 rpm, 6-cylinder Caterpillar engine with 100 kw, 150 volt ac Westinghouse generator. The 75 kw, 450 volt Bogue emergency generator is driven by a 150 bhp, 1800 rpm Cummins engine.

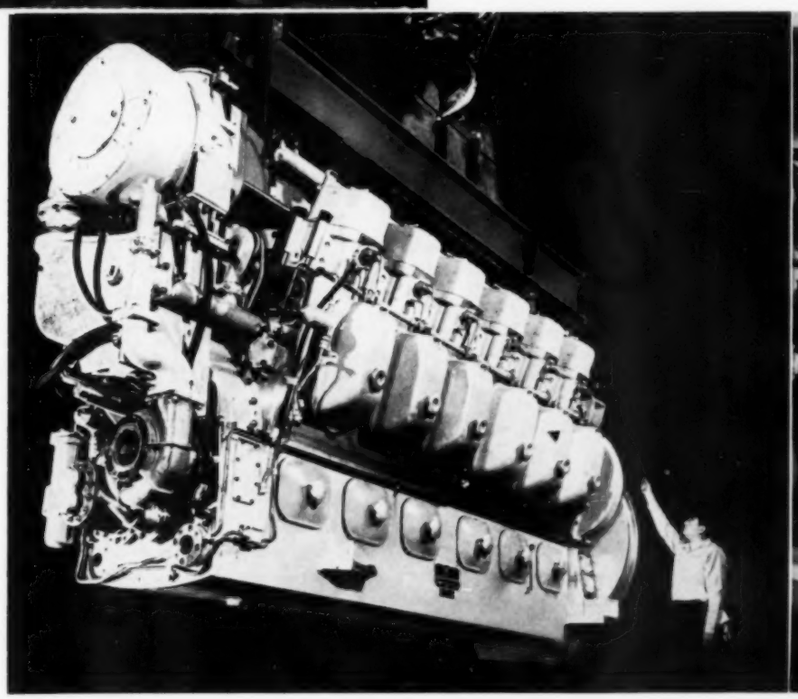
A central system supplies fuel for the main, ship-service and emergency diesel generating sets and the heating boiler. Included in the system are two 250 gph centrifuges, a 100 gpm horizontal rotary transfer pump and a 10 gpm rotary hand pump in standby. A 50 gpm lube oil transfer and priming pump is of the rotary type; a 10 gpm rotary hand pump is in standby. A 16 gpm rotary lube oil pump supplies the main motor, with a 10 gpm rotary pump in standby. The lube oil centrifuge, of the same type as the fuel oil centrifuge, has a capacity of 150 gph. The heater for the lube oil centrifuge, operating on 35 psig steam, raises the oil temperature from 100° F. to 180° F. Fresh water discharged from jacket water coolers cools propulsion and ship-service diesel generator sets.

The ship-service diesel engines have a salt water circulating system, with a circulating pump attached to each engine. Two 200 gpm centrifugal booster pumps are provided.

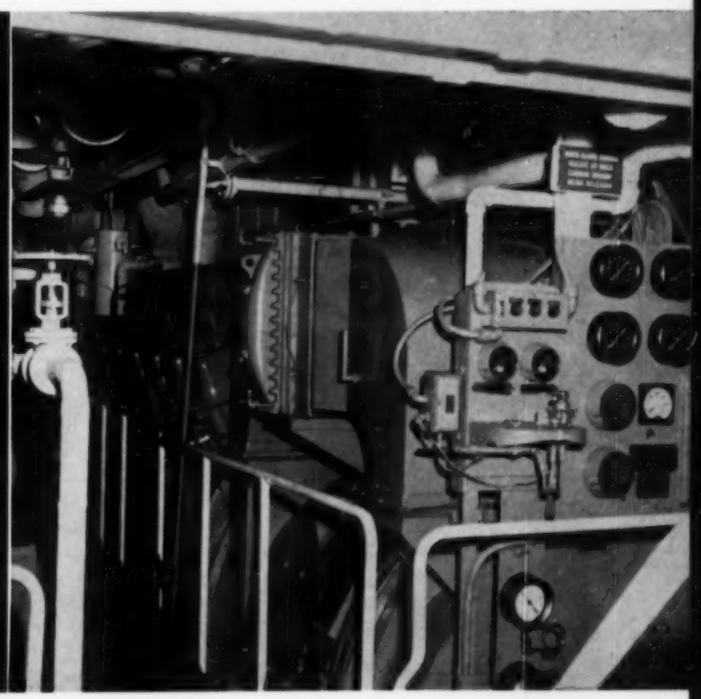
Diesel starting and ships service air is provided by two complete compressed air systems. In an emergency, through use of a reducing valve, air from the starting system can be directed to the ship-service system. A separate fresh water system is provided.

Principal Engine Room Equipment of the USNS *ELTANIN*

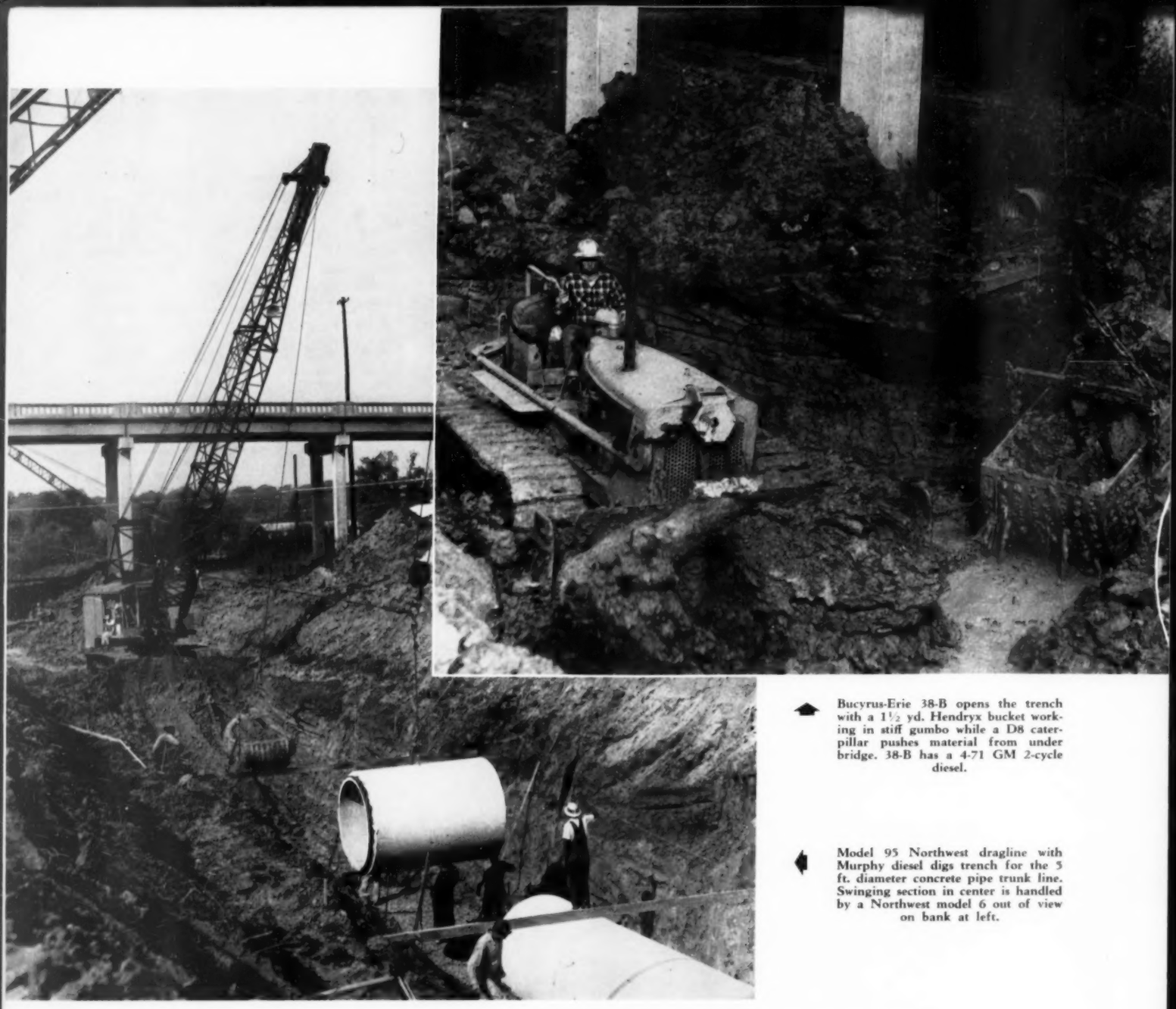
Main propulsion engines (2)	Alco
Generators	Westinghouse
Auxiliary engines (3)	Caterpillar
Auxiliary engine	Cummins
Auxiliary generators (3)	Westinghouse
Auxiliary generator	Bogue
Aftercoolers	Harrison
Steering gear	Western Gear
Fuel oil strainer	Cuno
Governor	Woodward
Jacket water coolers	Ross
Lube oil centrifuge	Sharples
Fuel oil centrifuges	Sharples
Air compressors	Worthington
Fuel oil pump	Tuthill
Fresh water pump	Buffalo
Diesel oil transfer pump	Worthington
Standby diesel oil transfer pump	Worthington
Standby and transfer lube oil pump	Gould
Expansion joints	Zallea
Spark-arrestor silencer	Maxim
Thermostats	Amot
Heat exchangers	Ross
Duplex fuel filters	Nugent
Lube oil filters	CFC Fulflo
Life boat diesels (2)	Gray Marine
Work boat diesel	Gray Marine



This turbocharged 1600 hp Alco Model 251-B diesel engine is similar to those powering the ice-strengthened cargo vessels *Eltanin*, *Mirfak* and *Mirzar*. The 12-cylinder V-type engine is equipped with a deep sump base in marine applications that permits full lubrication under maximum list conditions.



In place on the *Eltanin's* starboard side is one of its two diesel-electric propulsion sets—a turbocharged 1600 hp Alco 251-B diesel engine driving a 1100 kw, 900 volt Westinghouse generator which, in turn, supplies power to a double armature dc propulsion motor.



Bucyrus-Erie 38-B opens the trench with a 1½ yd. Hendryx bucket working in stiff gumbo while a D8 caterpillar pushes material from under bridge. 38-B has a 4-71 GM 2-cycle diesel.

Model 95 Northwest dragline with Murphy diesel digs trench for the 3 ft. diameter concrete pipe trunk line. Swinging section in center is handled by a Northwest model 6 out of view on bank at left.

LITTLE ROCK'S $5 MILLION SEWER JOB

By L. H. HOUCK

POPULATION problems, industrial growth and river pollution problems will be solved for the next 20 years at least for Little Rock, Ark., with the completion soon of a $5 million sewage system which includes a new expandable disposal plant and a new 6 mi., 5 ft. trunk line sewer.

Little Rock's rapid industrial growth was being hampered, and a 35 sq. mi. area could not be annexed without adequate sewage facilities. Burns & McDonnell Engineering Co., Kansas City, was employed to make a study and subsequently engineered the new system after funds were provided by a bond issue. For future expansion, the primary treatment plant was placed on a 60 acre site.

The project was placed in the hands of a new authority, the Little Rock Sanitary Sewer System, with T. W. Clapham as manager. The first contract was awarded July 16, 1958 to Forcum-Lannom, Inc., Dyersburg, Tenn., for $1,844,900 for construction of the treatment plant.

One of the difficult portions of the job was the big pipeline for the trunk line which had to be excavated to depths of 35 ft. in river bottom sand formations for a part of the distance and in contrary clay formations for two mi. or more. The big diameter pipe was placed in Section 1 of Contract 2 and awarded to Hardwick-Ingram Construction Co., West Memphis, Ark., Nov. 19, 1958 on its low bid of $2,025,929. Section 2 consisting of 48 in., 36 in., and 30 in., was let to Wade Lahar Construction Co., Tulsa, Okla., for $546,572.

The primary treatment plant required an excavation only 800 ft. from the Arkansas River 50 ft. deep and 250 ft. square, with a 24 ft. water table. A Griffith Wellpoint system was installed with 200 points which produced 4,000,000 gals. of water a day, on a 24 hr. basis, while the excavation went forward with two model 6 Northwest draglines and a Northwest 95, all with Murphy diesels. This problem-studded project was a diesel job from the start. For the deep trench excavation Hardwick-Ingram moved in a 3-W Bucyrus-Mon-

W. F. "Red" Pannell, general superintendent for Hardwick-Ingram, and C. A. Davis, pipeline superintendent.

ighan walking dragline powered with a D-364 Caterpillar diesel, which had the long reach of a 100 ft. boom, swung a built-up 4 yd. Hendryx bucket which provided a 5 yd. bite for each swing.

The trench from the river bank was no puny ditch. It started 66 ft. wide and more than 30 ft. deep with 1:1 slopes on banks. Dewatering was a problem and Hardwick-Ingram sub-contracted the dewatering at this stage to Mortrench Corp., Houston, Tex., and a single header line with four 10 in. pumps direct-connected to GM 2-cycle diesels, lowered the water table to working limits with wellpoints on 10 ft. centers. Heavy weight of the back-fill as a result of the depth of the trench was responsible for protective measures for the 60 in., 8 ft. long, 10,800 lbs. sections of concrete pipe. The first 2000 ft. was laid on a concrete cradle a foot thick and 7 ft. wide, which insured alignment after back-filling.

As the depth of the 6 mi. long trench decreased, the formation changed from sand to clay and gumbo. The big diesel walker was pulled out, its long reach no longer needed, and a Northwest model 6, with Murphy diesel, swinging a 2 yd. Hendryx bucket from a 70 ft. boom and a model 95 Northwest with an 80 ft. boom, a Murphy diesel, and a Bucyrus-Erie 30-B with 4-71 GM diesel and 1½ yd. bucket did excavation and pipe work.

When visited by DIESEL AND GAS ENGINE PROGRESS, the 30-B was making the primary excavation in wet clay and gumbo mud, followed up by the Northwest 95 in the bottom of the ditch completing excavation to grade and the Northwest model 6 on the bank swinging the 10,800 lb. lengths of concrete pipe. In spite of tough conditions, Hardwick-Ingram was two months ahead of schedule with their contract, which was the result of coupling know-how with adequate dieselized equipment of big capacities.

Most of the back filling was done with dozers although the draglines assisted when convenient. The dozer fleet included a D9, a D8 Caterpillar and a TD-18 International. The trunk line and the smaller lines were tunneled under existing highways and railroad tracks and six tunnels for both contracts were sub-contracted to Armco Drainage and Metal Products Co., which furnished the metal liners.

Hardwick-Ingram also sub-let the manholes to Frank H. Lee Construction Co., West Memphis, Ark. These manholes were located at 500 to 700 ft. intervals in the big trunk line and at all changes of direction, the primary purpose being for future cleaning. Lee used a Unit crane with a 3-71 GM diesel and using a ¾-yd. Gar-Bro concrete bucket, for pouring the manhole forms. Concrete was brought to the site by transit-mix trucks.

Key personnel included T. W. Clapham, manager of the Little Rock Sewer Department and in charge of the new system, representing the city of Little Rock. John McCann, resident engineer for treatment plant and Don Grim, resident engineer for the pipeline, represented Burns and McDonnell Engineering Co. J. T. Canada was plant superintendent and Fred Webb pipe superintendent for Forcum-Lannom. Hardwick-Ingram were represented by two veterans of heavy sewer construction, W. F. Pannell, general superintendent and project manager and C. A. Davis, construction superintendent. E. G. Shetley and H. J. Miller, superintendents, represented Wade Lahar.

Principal Heavy Equipment Used by Three Contractors

Contract No. 1 for construction of treatment plant, awarded July 16, 1958 to Forcum-Lannom, Inc., Dyersburg, Tenn., for $1,844,900.

2 Northwest draglines, model 6. Murphy diesels.
1 model 95 Northwest dragline, Murphy diesel
1 D8 Caterpillar dozer.

Contract No. 2 for installation of trunk sewer, Section 1, was awarded Nov. 19, 1958 to Hardwick-Ingram Construction Co., West Memphis, Ark., for approximately 6 mi. of 60 in. trunk line, for $2,025,925.25.

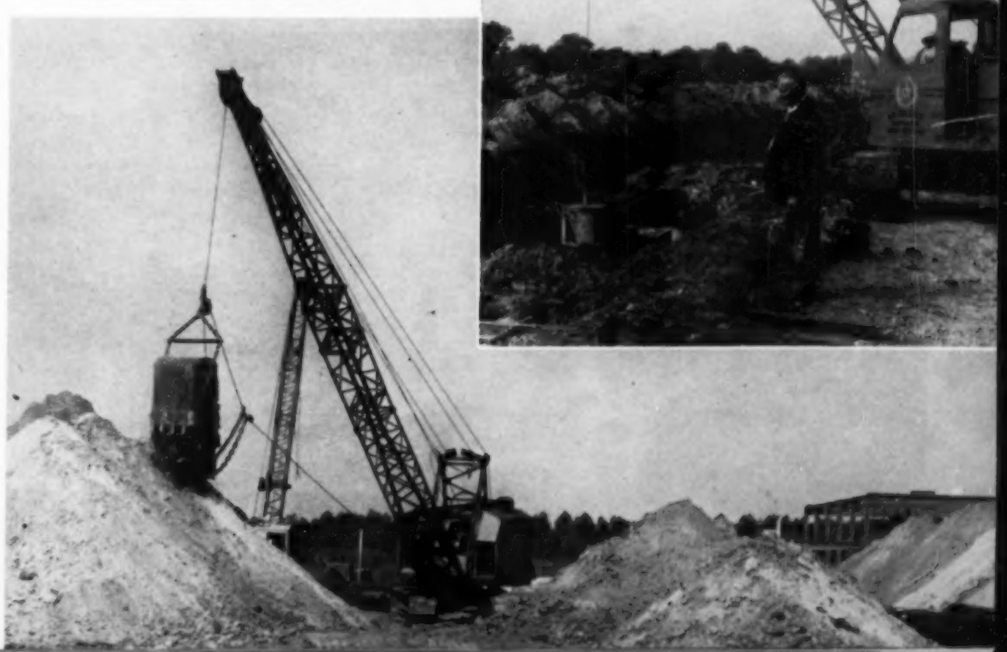
1 3-W Bucyrus-Monighan walking dragline, 4 cu. yd., D364 Caterpillar diesel.
1 Bucyrus-Erie 30-B dragline, GM 4-71 diesel
1 Bucyrus-Erie 22-B dragline, International diesel
1 model 95 Northwest, Murphy diesel
1 Northwest, Model 6, Murphy diesel
1 Caterpillar D9 dozer, Twin Disc torque converter
1 Caterpillar D8 dozer
1 International TD-18 dozer
1 Moretrench wellpoint system for dewatering, using four 10 in. Moretrench pumps powered with GM diesels.
1 Unit crane, ¾ cu. yd., 3-71 GM diesel

Contract No. 2, Section 2 for 30, 36 and 48 in. pipe, awarded to Wade Lahar Construction Co., Tulsa, Okla., Nov. 19, 1958, for $546,572.

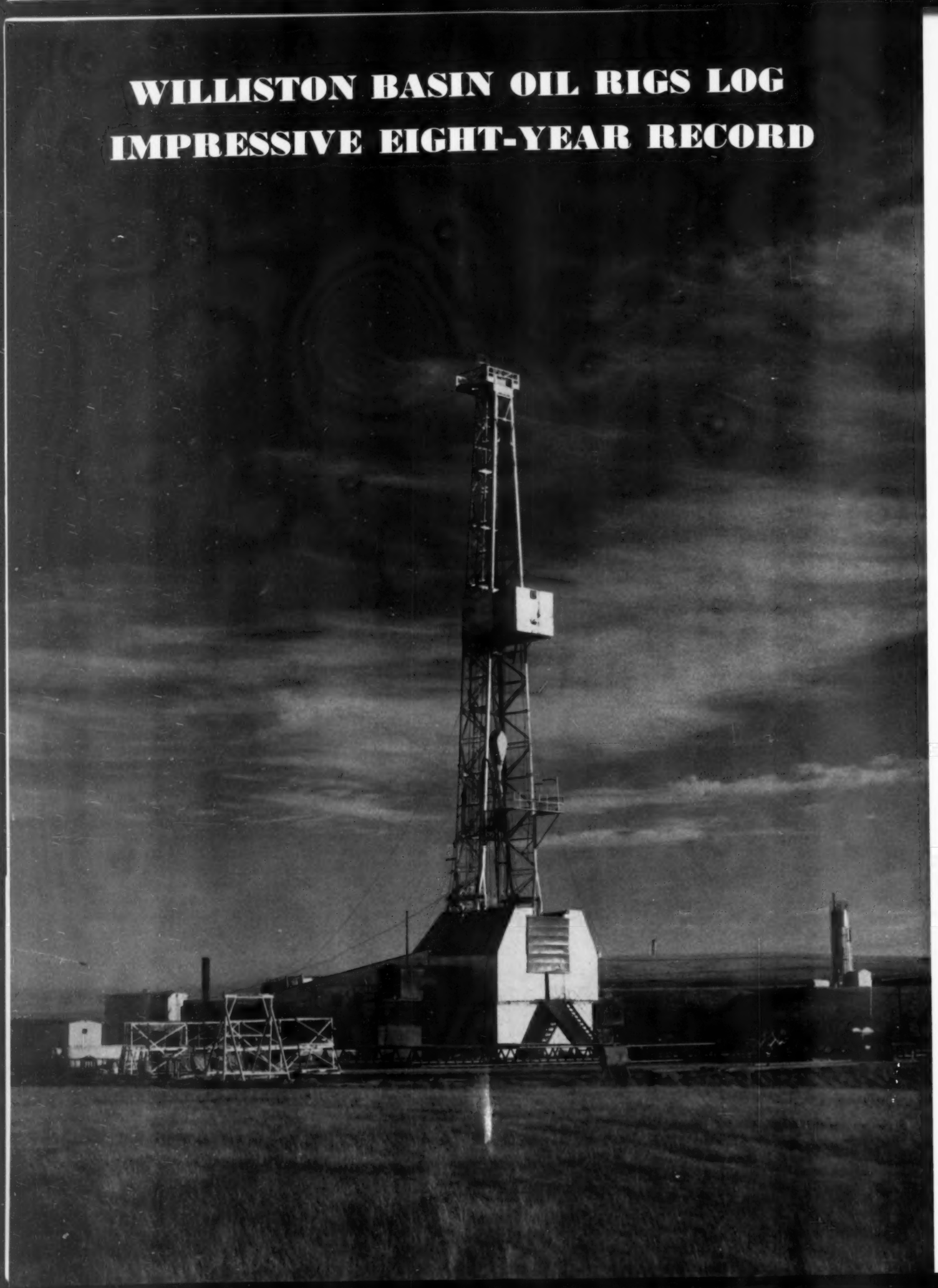
1 Northwest 80-D backhoe, Murphy diesel
1 Northwest Model 6, Murphy diesel
1 Insley Model K, GM diesel
1 TD-14A International dozer

Frank H. Lee, owner of the Lee Construction Co., checks the operation of the ¾-yd. Unit crane, with 3-71 GM diesel, as it places concrete.

Northwest dragline with Murphy diesel working at the treatment plant. Some of the treatment plant's steel superstructure shows at right behind the dumps belieing its erection over 50 ft. excavations in river bank sand.



WILLISTON BASIN OIL RIGS LOG IMPRESSIVE EIGHT-YEAR RECORD



DRILLING rig no. 1 is working on its 60th hole for Worley & Harrell, Inc., and has already logged some 63,000 hrs. of operation. Without a single major overhaul on the original power group of three Superior 6G-510 gas engines, the National 80B rig has been working since December, 1951 in the Williston basin of North Dakota. As of January 1, Worley & Harrell also has recorded 56,000 hrs. on their identically-powered seven-year-old rig no. 2 for a grand total of over 1.1 million ft. drilled in less than eight years with no engine overhauls!

How do they run 357,000 engine hrs. without an overhaul on any of the six engines? Good maintenance practice, good crewmen, and rugged engines are the Tulsa, Okla., firm's answers. In ordering their initial rig, owners Lloyd Worley and Burrel Harrell chose Superior 6G-510's: six cylinder, four cycle units with bore and stroke of 8½x9 ins. and rated 300 hp at 900 rpm. The engines are equipped to operate on butane/propane fuel. They drive National Supply type 80 drawworks with three section type CLS drive group and two mud pumps through Twin Disc torque converter transmissions.

Since the first group measured up to expectations in the first six months, they ordered an identical power group for their second rig, which also operates in the Williston basin. As for maintenance, the value of a regular program became quite evident in the first half-year of rig no. 1's operation. Worley & Harrell were therefore able to initiate a proven routine when the new rig started to work.

Personal attention of the partners to all phases of their business has been an important part of the equipment success story. Mr. Worley, as president, handles contracts and other work with the firm. Mr. Harrell is both vice president and drilling superintendent. Since Burrel Harrell's job keeps him in close touch with his toolpushers, information goes straight from the owner to the crews, and their drilling record speaks for itself. In charge of rig no. 1 is toolpusher Elgin F. Burns; Bernard D. Iverson is the toolpusher in charge of rig no. 2. Bought to meet the specific requirements of continuous northern weather operation, the two rigs have drilled 1,118,078 ft. of hole.

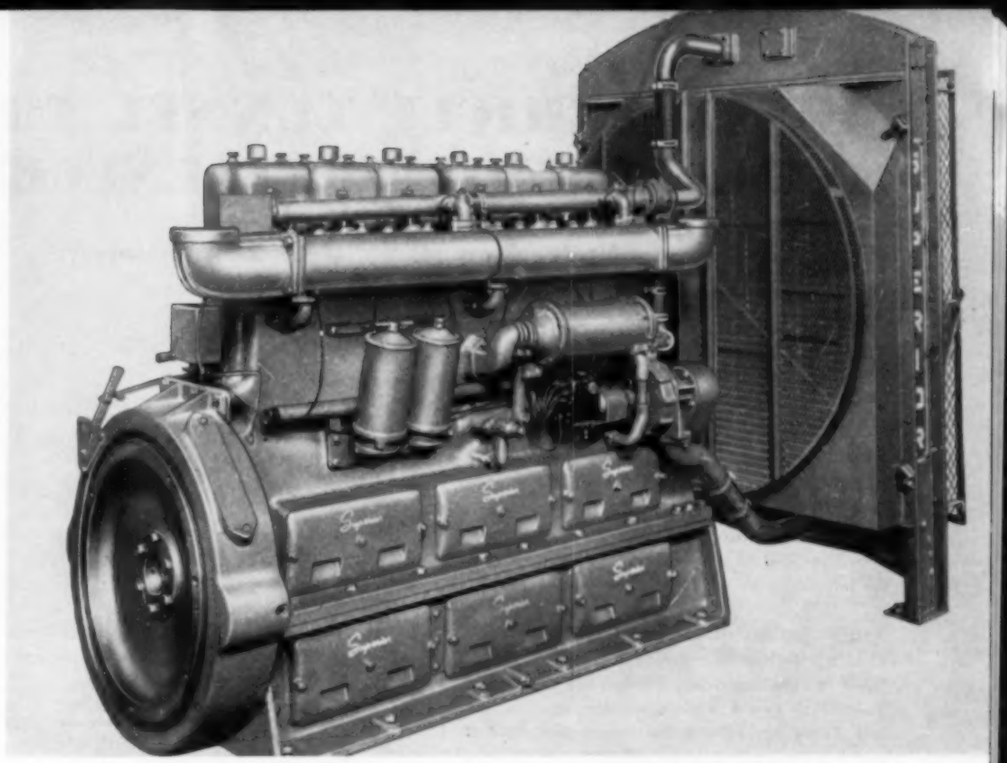
When rig no. 1 rode out the wildcatting phase of the Williston play, Worley & Harrell foresaw steady work on production drilling if they could keep rigs running at competitive costs. They invested in the additional rig with the idea of using identical equipment as the fields were developed, at the same time enabling them to accurately calculate their costs. While the work has averaged about 9,000 ft. per hole, rig. no. 2 tallied 14,828 ft. on one hole to hit solid granite—the deepest hole yet drilled in the basin. Wells have been averaging 10,135 ft. for rig no. 2 over the past 18 months, while rig no. 1 has averaged 11,465 ft. for the past six months.

For Williston requirements, Worley & Harrell equipped both rigs with Ideal C-350 and C-250 mud pumps; they now have three mud tanks with each rig. Three step rig layout is used, with 12 ft. substructure under the drawworks. Each rig has two light plants in a common shelter. The rest of the rig is balanced to the requirements of the pumps and the reserve power in the engines. Both 80B rigs have 142 ft. masts on a 20 ft. base. The masts are rated at 950,000 lbs. and they swing the hook and block rated at 350 tons on eight lines carried through the traveling block. They are able to hold 166 stands of 90 ft. pipe inside the mast when coming out of the hole.

Butane/propane equipment was used for the first two years of drilling, and the Tulsa firm still keeps it on the engines for standby use. Normally, they use gas whenever a line can be laid from the nearest processing plant at Tioga, N. D.

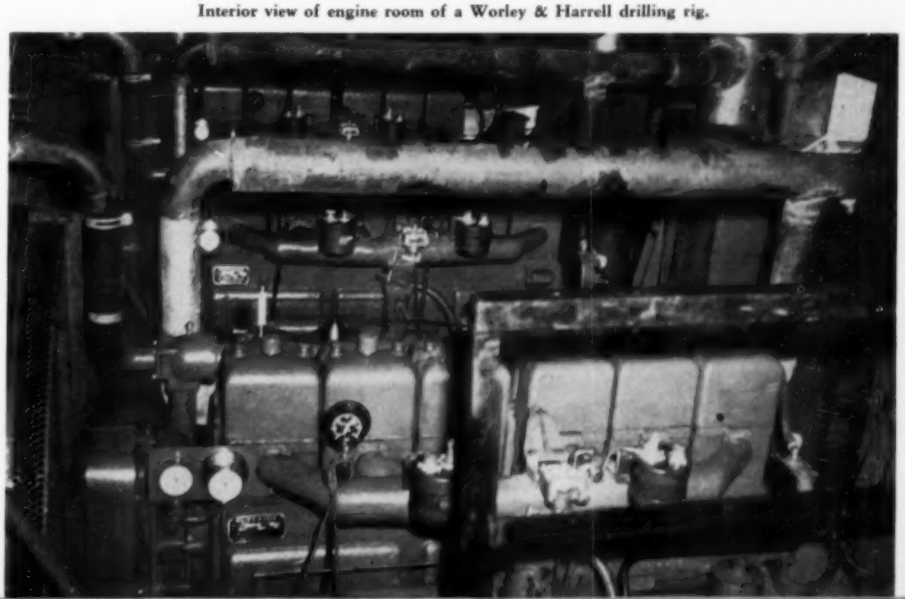
The maintenance program that has brought so much success to Worley & Harrell embodies the following points: daily, weekly, and monthly inspections and preventive maintenance. That this system has achieved results is borne out by the footage drilled by the two rigs. Inspection of the engines on rig no. 1 in September, 1958 revealed (after 45,000 hrs.): no bearing wear whatsoever, original liners in position with only minute wear, and original pistons still in place. Rings have been replaced, and heads have been switched for an occasional valve-grinding job, but whatever service has been required in the past six years has been administered right on the rig.

Both Lloyd Worley and Burrel Harrell, who was a drilling superintendent before he entered the contract drilling business, agree that the long continuous service record of their engines and rigs has made their business position stronger each year. "Since we started up in December of 1951, I have never seen a rig that ran so free of trouble," Harrell says. "We bought a second rig with the same equipment," he continued, "we've had wonderful service and are expecting the same good engine performance for many a hole ahead."



The Superior 6G-510 gas engine is rated 300 hp at 900 rpm. Three of these engines, equipped to burn butane/propane fuel, supply power for each drilling rig.

Interior view of engine room of a Worley & Harrell drilling rig.



This drilling rig, owned by Worley & Harrell, is one of a pair that has logged a total of 357,000 hours on six Superior gas engines without a major overhaul.

MOTOR VEHICLE TUNNEL TO END A TRAFFIC BOTTLENECK

Four Lanes Under New River at Ft. Lauderdale Will Replace Old Bridge in $6.5-Million Federal Highway Aid Project

By ED DENNIS

THE first motor vehicle tunnel under a river on any main highway in the State of Florida is being constructed in Fort Lauderdale by the Thorington Construction Co. Using the open trench method of construction, the contract calls for completion by early 1961.

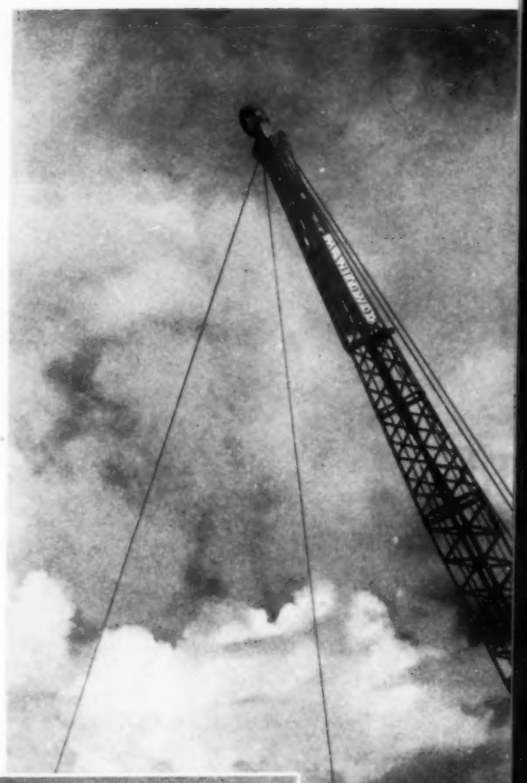
This $6½-million federal aid job will provide two 24 ft. roadbeds of U. S. Highway 1 under the New River in Fort Lauderdale. The job was awarded in June, 1958 to the Thorington Construction Co. and Alfred Spear for a low bid of $6,473,229.50 and is federal aid project U-003-3(28). The tunnel will have twin 24 ft. roadbeds for four lanes of traffic for a total length of 0.43 mi. and when finished will replace an antiquated bridge regarded by local and state authorities as one of the major traffic bottlenecks in the State of Florida.

The contractor is using the open trench method of construction. The work involves excavating and building the southern half of the structure to the middle of the river, blocking off this section with sheet piling and then constructing the northern half of the tunnel. The company is using 2000 tons of sheet steel piling and 1200 tons of bracing steel in this phase.

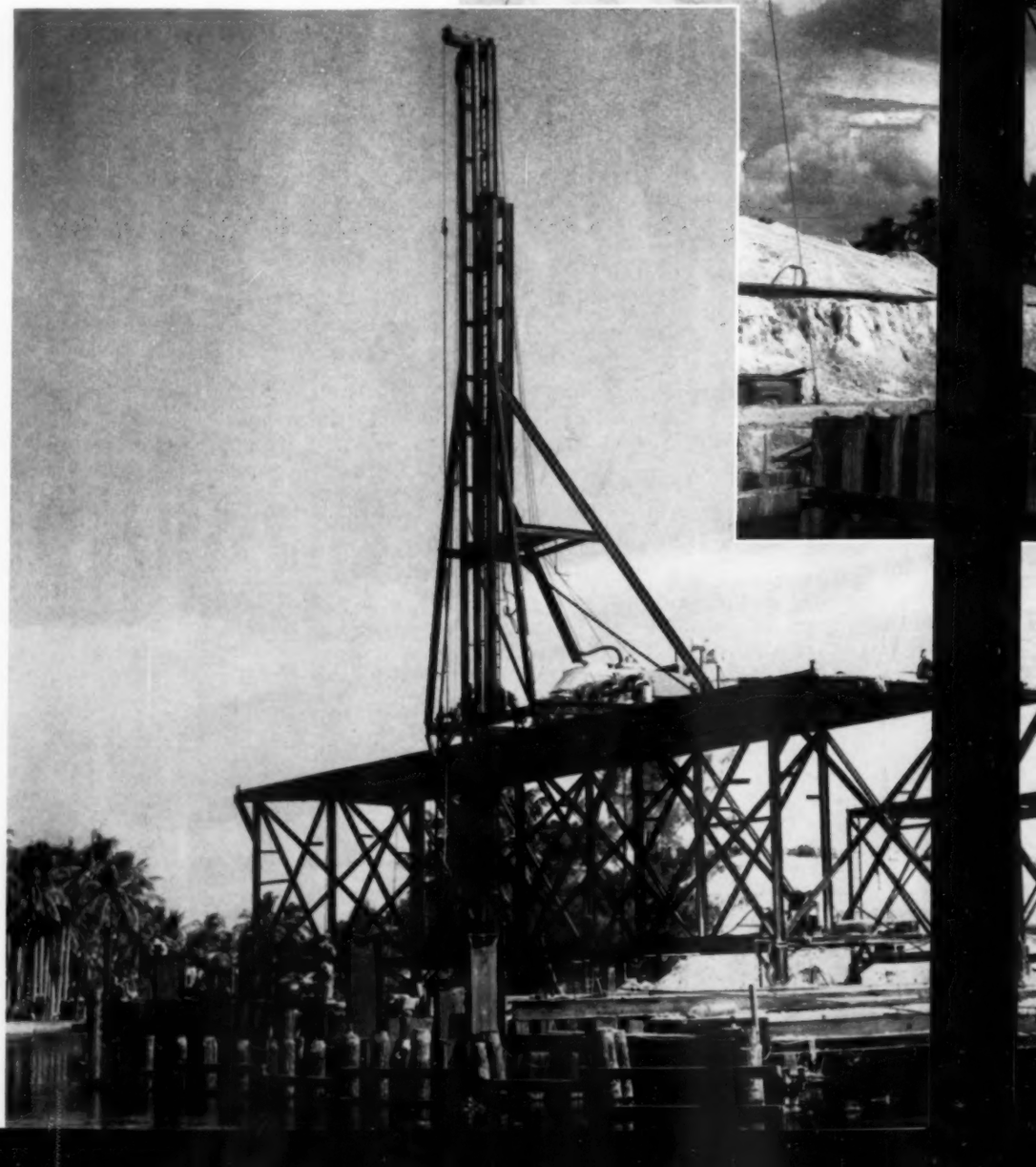
Excavation of dirt and rock material will amount to about 123,000 cu. yds. and will vary from eight to 50 ft. below ground level (about 40 ft. below the river level). Piling and cofferdam for the southern segment will end slightly beyond midstream so as to leave a 40 ft. marine passage for vessels on the New River. The completed tunnel will leave a 140 ft. river channel 14½ ft. deep.

An Ingersoll-Rand Gyro-flo air compressor powered by a General Motors 6-71 diesel engine is mounted high up on a pile driving rig constructed by the contractor and is used for driving the steel sheet pilings for the cofferdam on the south side of the river. Two Chicago Pneumatic air compressors, powered by GM 6-71 diesel engines supply necessary air for the model 3900 Manitowoc cranes being used for pile driving on the northern approaches to the tunnel. These cranes have N H R S turbocharged 250 hp Cummins diesel engines, with Twin Disc torque converters, for power.

Contruction calls for about 32,000 cu. yds. of Class A tunnel concrete, 17,000 yds. of Tremie concrete and 2000 tons of reinforcing steel bars. The outside walls will measure 2 ft. 9 in. thick, the ceiling 3 ft. 4 in. thick, the roadway slab in the tunnel will be 2 ft. 7¼ in. thick above the waterproof-



The model 2300 Cummins dieselized Manitowoc crane being used on the southern end of the open trench tunnel. Two model 3900 Manitowoc cranes powered by model NHRS 250 hp Cummins diesel engines and Twin Disc torque converters were being used on the northern approaches.



The pile driving rig used to drive the steel sheeting for the sides of the open trench. This rig was designed and made especially for this particular job by the Thorington Construction Co. The General Motors 6-71 diesel engine powers an Ingersoll-Rand air compressor. The rig is on the south side of the New River and half way across the river's channel.

The two Fairbanks-Morse 2 stage vertical lift, 6000 gpm, 52 ft. head, dewatering pumps powered by two Fairbanks-Morse model 49B4½ diesel engines. Each 6 cyl. engine is rated 180 hp at 1800 rpm. These were being used on the southern end of the open trench tunnel for dewatering purposes.

ing plate. Two Fairbanks-Morse 2 stage vertical lift pumps each rated 6000 gpm at 52 ft. head and powered by two Fairbanks-Morse 49B4½ diesel engines (180 cont. hp at 1800 rpm), are being used for dewatering the open trench. The contractor is also using four Moretrench 450 gpm dewatering units powered by GM 6-71 diesel engines. The ends of the tunnel will be so constructed that they will be above any recorded flood level in that area or nine ft. above sea level.

One of the oddities of this construction job is that the contractor is required to maintain water traffic on the New River rather than land traffic as is required by the usual run of road contracts. All land vehicle traffic is being detoured around the excavation. A 40 ft. wide and eight ft. deep channel in the river must be maintained as required by the Army Engineer Corps.

A model 40SX8 Superior turbocharged diesel engine manufactured by the White Diesel Engine Div., White Motor Co. will be located in the south ventilation building to act as standby to operate the tunnel ventilating fans and drainage pump in case of an electrical power failure. This Superior diesel is rated 712 hp at 900 rpm, 131 bmep and will have a 500 kw 480 volt two bearing General Electric generator and General Electric switchgear. The south ventilation building, housing this dieselized unit, was completed the latter part of 1959. Among the major pieces of dieselized equipment currently being used on the job are:

2 #3900 Manitowoc cranes, 250 hp Cummins diesel engines and Twin Disc torque converters

1 #2300 Cummins dieselized crane also with a Twin Disc torque converter

1 Caterpillar powered Marion crane

1 Caterpillar Traxcavator

2 180 cont. hp Fairbanks-Morse dewatering units

1 Lincoln arc welder powered with a GD157 Continental diesel engine

and about a dozen other pieces of equipment powered by series 71 General Motors diesel engines including 2 Ingersoll-Rand compressor units with GM 4-71's, 3 Griffin well point pump sets with GM 6-71's and 2 Chicago Pneumatic air compressor units also with 6-71's. These are used with the Manitowoc cranes on the north end of the tunnel for driving sheet steel bulkheads.

The Lincoln arc welder powered by a 4 cyl. model GD157 Continental diesel engine rated 39 hp at 2000 rpm. Note Roosa Master fuel injection system and Fram lube oil filter.

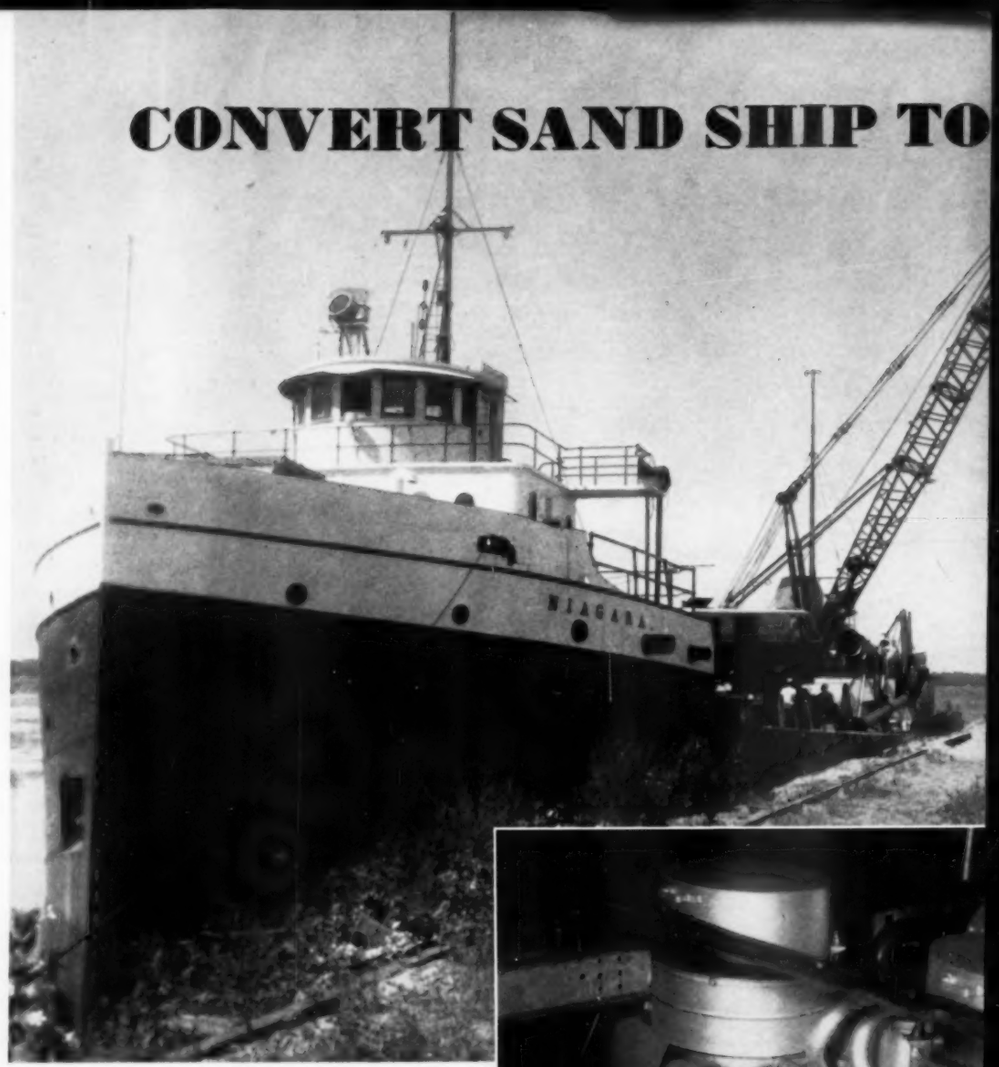
CONVERT SAND SHIP TO

By WALTER RUDOLPH

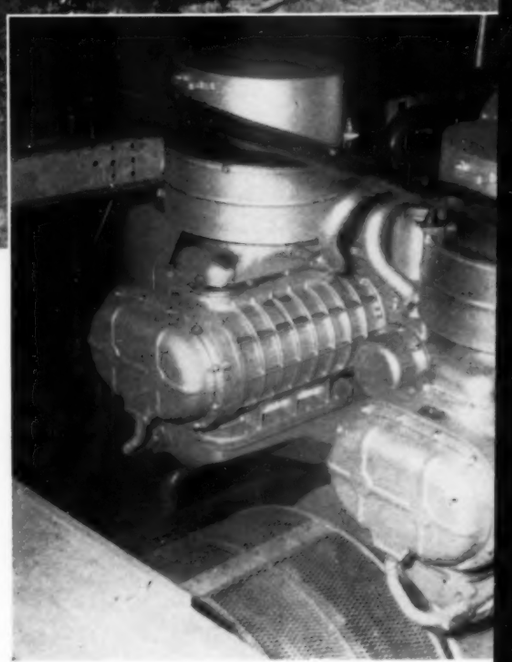
ERIE Sand Steamship Co., Erie, Pa., is no beginner when it comes to making over a practically obsolete steam-powered vessel into a smartly running, profitmaking dieselized ship. Previously, this firm converted the *Scobell* to diesel-electric drive; the *Lakewood* was the second conversion, this time to diesel-air. And now, the *Niagara*, diesel-air itself, joins the modern sand-sucking fleet. The *Niagara* has even another innovation in this type of Great Lakes work, she mounts a deck crane, a Bucyrus-Erie 51B, with Caterpillar D-337 diesel engine. This "live boom" crane (70 ft.) with a 2½ yd. clamshell, enables the *Niagara* to self-unload practically anywhere she can dock.

Erie Sand does its own conversion work under the direction of Capt. Joseph S. St. John, company owner, and George Griswold, chief engineer, with several experienced mechanics. They took the *Niagara*, owned before conversion by Gravel Products, of Buffalo, N.Y., and began stripping her in the spring of '59. She had a 900 hp steam triple expansion reciprocating engine, make undetermined, reports Mr. Griswold. One of the old boilers was removed, one easily converted to an air receiver. Onto the old steam engine's foundation, with some modification, was set the *Niagara's* new propulsion unit, a GM Cleveland model 12-567 diesel engine with Wichita air clutch and Falk 4.3:1 reduction gears. The 9 ft. 3 in. by 6 ft. 2 in. wheel was placed, and this, with the 1250 hp drive, gives the newly activated ship a good 11.8 mph cruising speed when light and 11 mph when carrying a full load of about 1700 cu. yds. of sand—very wet sand, we might add, fresh from the bottom of the lake.

As for the diesel-air part of the story, Griswold explains that Erie Sand's experience proves out this as the most practical type of ship operation for this particular job—that of repeated, comparatively fast trips out into the lake, the sand dredging routine itself, and the return to a dock where quick emptying is essential to a profitable business. Seven diesel units give auxiliary support to this operation, while two air compressors,—Ingersoll-Rand units (600 cfm each) using two of the seven diesel auxiliaries, GM 6-71's, for main and auxiliary air power—enable the *Niagara* to use compressed air to power a number of old, rebuilt steam engines for various kinds of ship work.

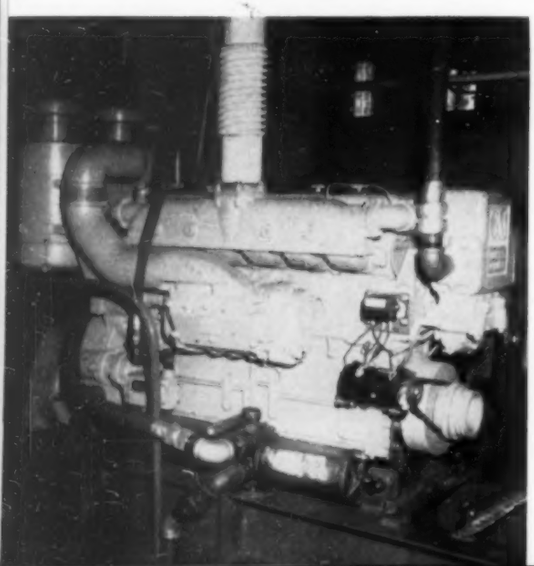


"Doing her job"—the *Niagara* was specially equipped with this Caterpillar diesel driven Bucyrus-Erie deck crane with 70 ft. boom and 2½ yd. clamshell for unloading on dock not equipped to help ships with sand cargo.



This GM Cleveland diesel model 12-567 rated 1250 hp supplies main propulsion power for the *Niagara*. Power to the shaft is transmitted through a Wichita air clutch and Falk reverse and reduction gear. Note Air Maze filters. Engine is equipped with Briggs oil filter, Marquette governor.

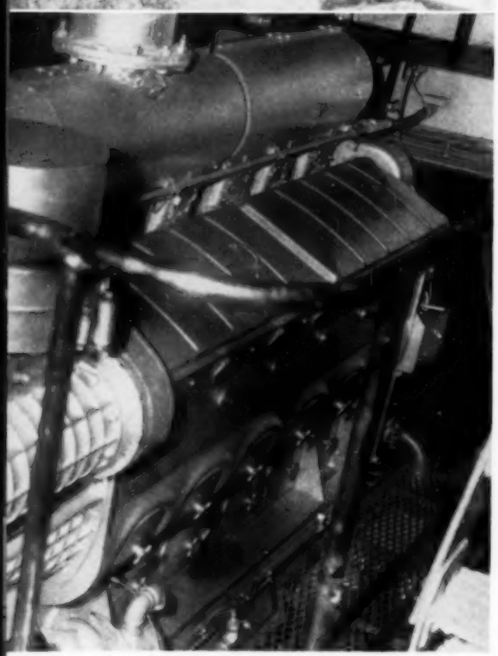
Two GM Diesel 6-110's drive the big sand pumps of the *Niagara* at the pumping grounds; Ingersoll-Rand air starters are used.

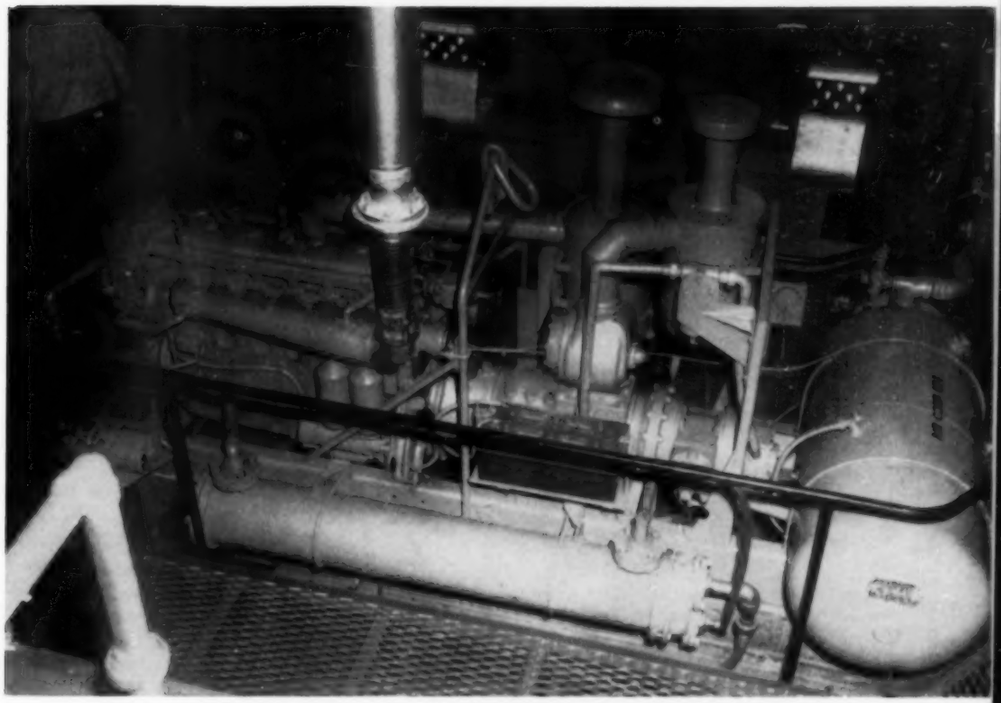


But first, as to the other diesels: another twin pair are the GM 6-110's, 250 hp each, for belt driving, through V-pulleys, the big sand dredging pumps when on the sand grounds. Incidentally, both big air compressor units, interconnected, are used in air-siphon starting of these powerful sand pumps. The GM 6-110's have air starters. Finally, two more GM diesels, 6-71's, power the two 60 kw ac Delco generating sets, only one of which, as a rule, is needed for routine operation. Considerable savings in the conversion resulted from rebuilding steam-powered hose hoistwinches, mooring winches, anchor windlass, standby water pump for sand glands, steering gear equipment, and similar equipment so all could use air power, kept at about 120 lbs. with the main IR compressor. Four lubricators, using No. 10 oil, are in the old steam lines now carrying air. Several lubricators are used on pieces of converted equipment, depending on location of such equipment. Cylinders of converted steam equipment were rebored and pistons renewed, along with rings, in the conversion process.

Taking a closer look at the *Niagara's* controls and the main engine: controls are Morse and fully pneumatic, deriving power from an electrically powered 3 hp. 35 cfm Ingersoll-Rand compressor. This compressor starts the main engine and runs continuously while the vessel operates. These controls are single station and remote control, or can be run from the wheel house, or remotely, in the engine room. Ship's air is 125 lbs. psi.

DIESEL-AIR





Main Ingersoll-Rand air compressor, rated 600 cfm, coupled to GM 6-71 diesel. Air from this compressor is sent into boiler converted to air receiver, lower portion visible at rear.

The GM 12-567 main engine was installed in March, 1959 and about the first week in August had its initial running lake trial. The *Niagara* was expected to average 16 hrs. operating time daily, in about 140 lake trips in the '59 season; running time for the main engine includes trolling at the material pumping grounds. Different materials require different loading times. This main engine uses No. 2 fuel oil. Lube oil is Shell Talona MR 40; lube oil filter is a Briggs model D-12 BR-HV5A. Engine governor is a Marquette model 21-90180.

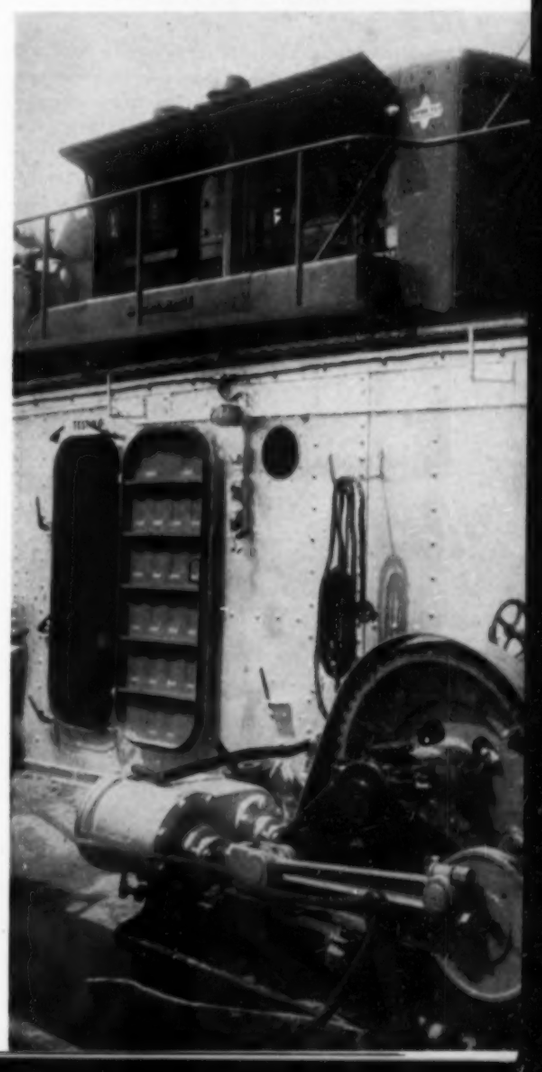
There is no "typical days" routine for the *Niagara's* operations; as indicated it varies according to the distance from port or unloading site to the trolling or pumping grounds in the lake, and also varies in loading time at the grounds, depending on lake conditions and the material being loaded. Covering all these conditions, an average trip is 16 hours time, as stated before.

Mr. Griswold reports that the Wichita air clutch as satisfactorily proven in many applications, is ideal for the *Niagara's* work. Air power in this application, said Griswold, gives the *Niagara* quick reversing ability, and is especially valuable in giving the captain remote control of the ship on the pumping grounds. The ship's speed is very important in coordinating movement with material gathering or pumping and the entire operation can be efficiently run from the wheel house. Lower Lake Erie ports will be the principal unloading sites for the *Niagara*. For the record, the old steam-driven *Niagara* was both a sand boat and a package freighter, the latter even on salt water during World War II; she was converted back to sand after the last war. It is believed she was originally built by Bay City Shipbuilding Co., in the early 1900's.

Principal Equipment Serving The *Niagara*

Main engine	GM Cleveland Diesel
Sand pump engines (2)	GM Diesel
Generator engines (2)	GM Diesel
Generators	Delco
Deck crane engine	Caterpillar
Air filters	Air Maze
Reverse reduction gear	Falk
Air clutch	Wichita
Air starters	Ingersoll-Rand
Lube oil filters	Briggs
Governor	Marquette
Air compressor	Ingersoll-Rand
Air motor	Ingersoll-Rand
Lube oil	Shell

On the deck, aft, mooring winch sets below auxiliary Ingersoll-Rand compressor, 600 cfm, with GM 6-71 diesel engine. Compressor units are interconnected, and both used when siphon-air starting the sand pumps.



CUMMINS' NEW DIESELS FOR STOP AND GO SERVICE

Here is a Report on the Economies of Diesels in In-City and Terminal Delivery Use and a Look at The Seven Diesels in Cummins' Line Which Are Aimed For Those Applications

By ROBERT E. SCHULZ

COLUMBUS, Indiana—How economical are diesels for in-city and terminal delivery service? Up until 1959 this was a somewhat difficult question to answer. Now, within the past year a number of engine builders have brought out new or extensively redesigned diesels especially for this market and a wide variety of installations have been made. More important—field cost records show significant "dollar and cents" savings among both small and large fleet operators. One of the engine builders that is taking firm steps to serve this market is Cummins Engine Company, and in Columbus I saw their new line of 70 to 160 hp "stop and go" diesels and discussed their operating features and applications with company engineering and sales officials.

Before taking a close look at the seven diesels that comprise the stop-and-go line, four of which are totally new to Cummins, let's briefly examine the range of application for which they have been developed. Basically, Cummins has set up two GVW classes in which they will concentrate—16,000 to 19,500 GVW, and 19,500 to 26,000 GVW. These represent the trucks built for terminal delivery for OTR truck fleet operators, aggregate and ready-mix hauling, in-city fuel and large parcel delivery, rural milk pick-up, intra-city produce, in-city industrial delivery and many other services where a set yearly operating pattern is established and the truck is in daily use logging enough miles and/or hours to make diesel economy and dependability pay off in lower operating costs. According to production records, approximately 206,000 trucks of the 1,150,000 built in 1959 are in this 16,000 to 26,000 GVW class.

To substantiate the economy of diesels in this service, Cummins has been reaching out for repowering installations through its distributor organization and thus far better than 200 vehicles have been converted from gasoline to diesel. Results have been generally very satisfactory and the following tabulation will give you an idea of the type of savings being experienced:

Gasoline	Diesel	Type of Service
4.6 MPG	8.8 MPG	Milk (rural pickup)
5.0 MPG	9.0 MPG	Intra-city
4.5 MPG	6.2 MPG	Brick Haul
5.0 MPG	7.5 MPG	Gravel Haul
3.6 Gal./hr.	2.0 Gal./hr.	Ready Mix
68 Gal./Day	13 Gal./Day	Dump Truck
20 Gal./Day	5 Gal./Day	In Plant Delivery
15 Gal./Day	5 Gal./Day	City Haul
100 Gal./Day	35 Gal./Day	Milk

Meanwhile, what about the OEM reaction to this program? Two of the large volume truck manufacturers are now offering vehicles with the smaller engines, but their attitude is mainly one of "wait and see" at this point before they enter full scale promotion. A third major manufacturer has stop-and-go diesel trucks in pilot installation stage at

White's new 3016D city pickup and delivery truck with power-tilt cab developed for service in congested areas is powered by the new JN-130 diesel. This unit is equipped with Winslow filter and Fram air cleaner.

Repowered with the Cummins C-160 engine, this IHC 205 is one of 75 city delivery units operated by Hermann Forwarding Co. of New Brunswick, N. J. Note Luberfiner air filter.

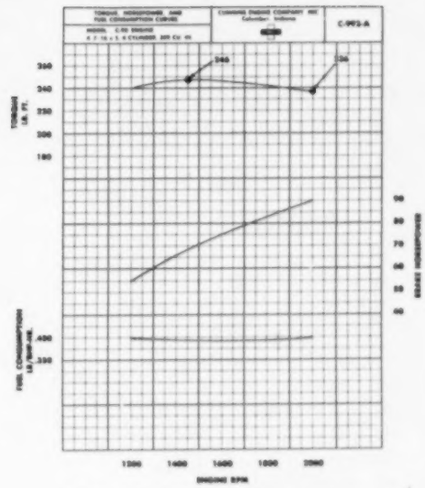
This Ford model F-800 tractor, owned by Nello L. Teer Co. of Durham, N. C., was repowered with a Cummins 160 hp diesel. Trailer dump has 20 ton capacity. Tractor covers 280 miles/day and averages 8 mpg compared to similar gasoline engine powered tractor's 4.75 mpg.

Piedmont Construction Company's B-42 ready-mix truck repowered with the C-160 diesel. Traveling 98 miles/day, truck averages 2 gals./hr. compared to gasoline trucks 3.8 gals./hr.

the present time. Obviously it's to the user's benefit to obtain a new diesel vehicle in this GVW range rather than encounter the additional expense of field conversion even though this can be readily amortized by the savings of diesel operation. Cummins expects that the latter, once established by an operator, will prompt him to order a diesel in new fleet additions and the pattern of installation will generally shift in this direction. Truck manufacturers appear to concur. We'll take a look at specific operating reports and installation costs later in the article, but now let's take a look at the new engine line.

Seven engines have been classified by Cummins in the stop-and-go category, the J-70, J-80, C-90, C-105, JN-130, C-140 and the C-160. The J series engines were introduced by Cummins in early 1959 and for a complete story on their development see the December 1958 issue of DIESEL AND GAS ENGINE PROGRESS. Briefly the J-70 and J-80 are identical in their design characteristics, the former being rated 70 hp at 2000 rpm, and the latter 80 hp at 2500 rpm. Both are four-cycle, four cylinder naturally aspirated engines with a 4¼ in. bore and 5 in. stroke. The J-80 has a maximum gross torque of 198 lbs. ft. at 1300 rpm and it weighs 1150 lbs. with standard accessories, or 14.375 lbs./hp. The JN-130 is a six-cylinder version of above diesels rated 130 hp at 2500 rpm. Note on the performance curve that the maximum gross torque is 295 lbs. ft. The JN-130 has a net weight with standard accessories of 1555 lbs., giving a ratio of 11.96 lbs./hp.

The "C" series diesels are totally new to the line and in their development Cummins engineers have stressed the same construction and operating features which have distinguished their engines in OTR duty. Chief aim according to C. R. Boll, vice president-sales is to give truck operators in the 16,000 to 26,000 GVW class service life, dependability and economy which will make the diesel pay-off in the lighter-duty applications. "An important part of the design work on the new engines," Boll stated, "was on idling efficiency. Many of the operators who will use these diesels may be idling them 3, 4 or more hours a day. Experience tells us that these stop-and-go diesels will idle 3½-4 hours on a gallon of fuel—four to five times longer than gasoline engines." All of the C series engines are similar in that they are four-cycle diesels with a bore of $4\frac{7}{16}$ in. and a stroke of 5 in. They all have open-type combustion chambers, overhead



Performance curve of the Cummins four-cylinder C-90 naturally aspirated diesel.

valves, roller-type cam followers and PT fuel system found on the other engines in the Cummins heavy duty truck engine line. In addition, note the following specifications:

Bearings—
- Camshaft: five or seven depending on cylinders; front 1¾ in., all others 1⅞ in. dia.
- Crankpin: 2⅝ in. dia. Removable precision type shells. Projected area 4.30 sq. in.
- Main: 5 or 7 bearings, 3⅞ in. dia. Removable shells held in place by I-beam section caps. Total projected area 30.24 sq. in.
- Piston Pin: 3 bearings, 2 in piston and 1 in rod, 1½ in. dia.

Camshaft—Helical gear drive with controls valve and injector action.

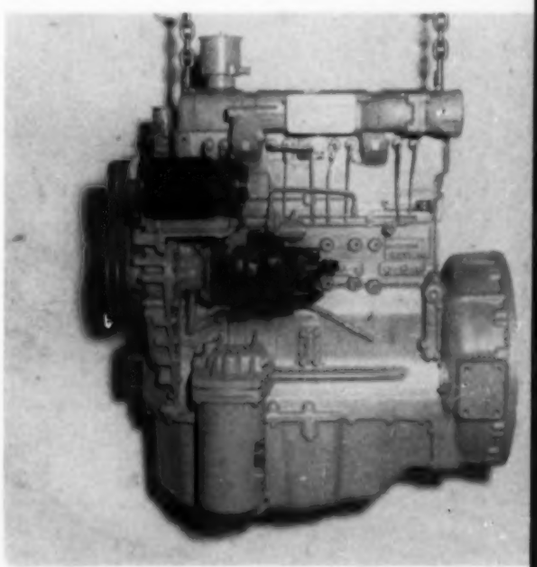
Oil Cooler—Tubular type, jacket water cooled.

Crankcase—Iron alloy cast integral with the block.

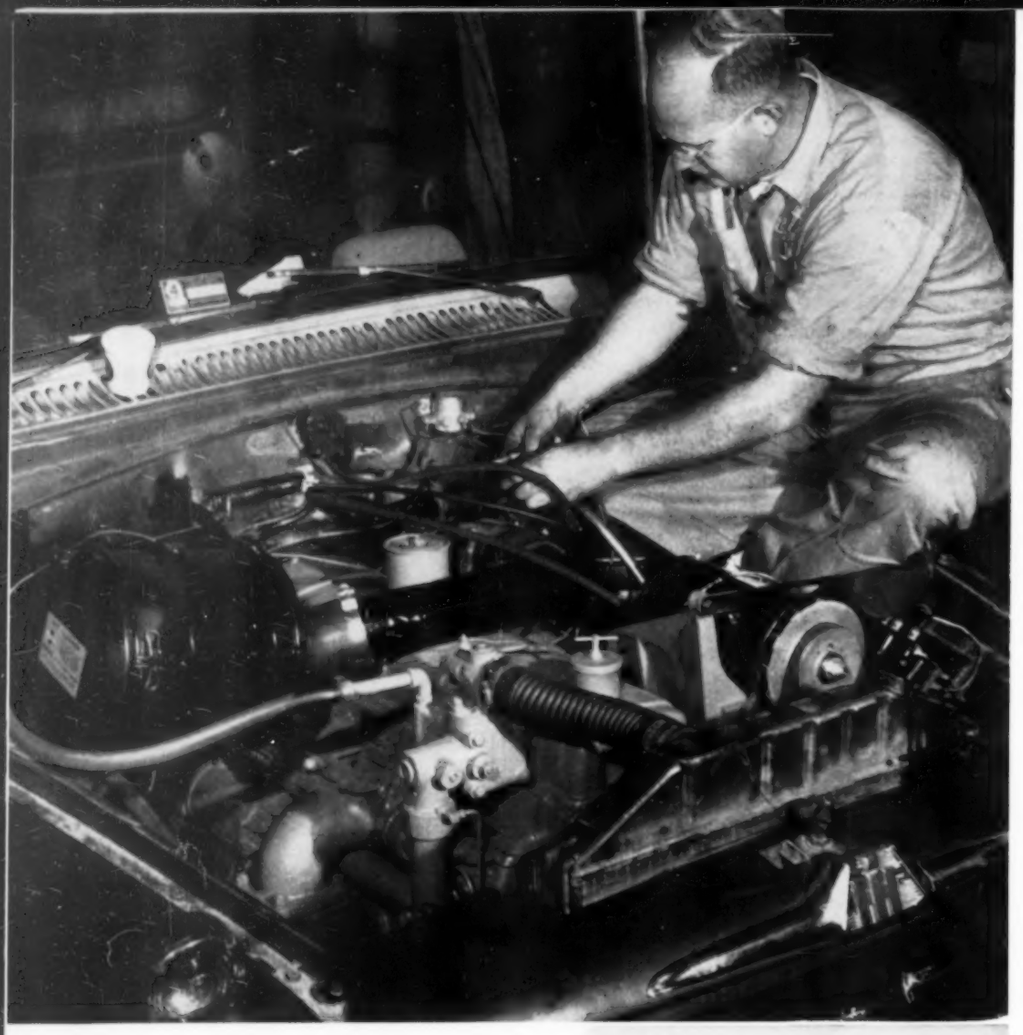
Crankshaft—Special high tensile strength steel forging. All bearing journals induction hardened. Fully counterweighted.

Cylinders—Cast enbloc with removable wet cylinder liners.

Electrical equipment—12 volt system with 12 volt



Production line view of the C-105 engine. Diesel is rated 105 hp at 2500 rpm and has a displacement of 309 cu. ins., overall length with fan is 35⅝ ins.



Cummins JN-130 diesel installed in an IHC 180 truck owned by Stark, Wetzel & Co., Inc. and used to haul meat to supermarkets.

and it's interesting to note the fuel consumption and torque characteristics. In contrast to gasoline engines with their high torque at top rpm, these diesels as well as other makes that are available for this service offer the operators much more useable torque, reduces gear shifting and allows them to stay in gear longer.

To estimate how many more miles per gallon operators can obtain with diesels compared to gasoline engines, Cummins developed the following conversion table. Present gasoline miles per gallon should be multiplied by the applicable diesel fuel ratio. To obtain daily or hourly diesel fuel consumption, divide gasoline gallons per day or hour by the applicable ratio:

Diesel Fuel Saving Ratio	Operation
1.5	Intercity trucking
1.5-2	Operations with 50-100 stops or 20% idling/day
2-2.5	Operations with 100-125 stops or 40% idling/day
2.5-3	Operations with 125-150 stops or 60% idling/day
3-4	Operations with over 150 stops or 80% idling/day

While in some areas there is still a somewhat marked difference in the cost of diesel and gasoline fuel, price advantage is rapidly disappearing and it is not now the principal factor in diesel repowering and operation. Diesel fuel usually costs 1 to 3¢ less per gallon and while savings can be chalked up here, the true value of diesels lie in their greater economy, less maintenance and consequently greater availability.

Cummins and the other automotive diesel manufacturers know that not all vehicles in the 16,000 to 26,000 GVW class lend themselves to repowering on a profitable basis. It is however feasible in all cases where service dictates the economy, and

starting motor, 50 amp. generator; voltage regulator, key type starting switch.

Governor—Mechanical flyball type built integral with fuel pump.

Cylinder heads—Four-valve head (J-70 & J-80 two valve) detachable-single casting with stellite inserts on exhaust valve seats. Valves of heat resisting alloy steel with 1¼ in. dia.

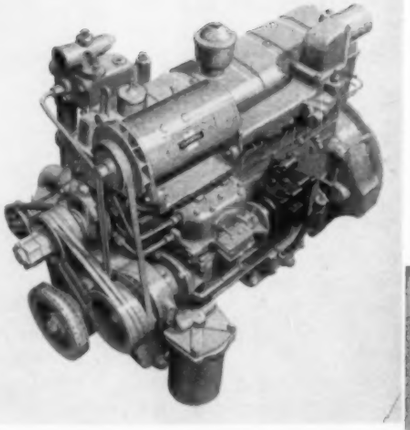
Flywheel housing—SAE #2 with mounting pads; flywheel machined for 12 or 14 in. single plate clutch.

Lubrication—Force feed with gear type pump located in oil pan.

Piston and rings—Pistons are aluminum, cam ground with 3 compression rings and 1 oil ring.

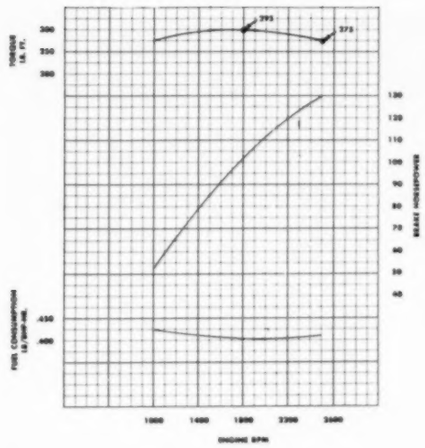
Connecting Rods—Drop-forged, 9½ ins. center to center.

The engines are basically grouped in four and six-cylinder models with number of cylinders, turbocharger and speed being the differentiating rating factors. The C-90, C-105 and C-140 are all four-cylinder diesels. The first is rated 90 hp at 2000 rpm, has a compression ratio of 15.8:1 and a net weight of 1185 lbs. The '105 is rated at 2500 rpm, has a compression ratio of 14.5:1 with the same weight as the '90. Turbocharging gives the C-140 its rated horsepower at 2500 rpm. In the December 1959 issue of DIESEL AND GAS ENGINE PROGRESS we presented the C-160 as well as its turbocharged version, the C-175. Performance curves of the C-90, 105 and 140 are illustrated on these pages



The JN-130 diesel has six cylinders and is rated 130 hp at 2500 rpm. Its net weight with accessories is 1555 lbs.

This standard 6-wheel dump truck was converted from gasoline to diesel by Lindahl Bros. of Chicago.



Performance curve of the Cummins JN-130 shows a rated hp of 130 at 2500 rpm.

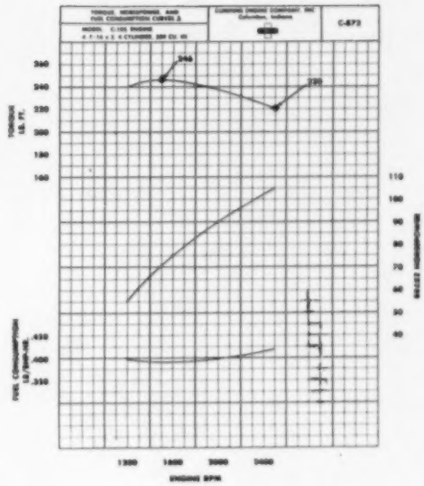
transmissions and rear axle ratios have sufficient capacity. Engineers at Cummins estimate that it takes from 75 to 125 hours to do the repowering work based on present installations. They have prepared conversion specifications based on distributor work to insure sound application and are preparing kits required for this work.

Illustrated on these pages are some of the repowering installations made by Cummins distributors. Operating records are available on these plus many others and let's take a look at a couple. B & B Milk Transportation Co. of Knoxville, Md., a company that hauls milk from the farms of western Maryland to the dairies in Baltimore now operates two model 180 International trucks with Cummins engines. The first, a 3600 gal. unit, was repowered with a JNS-6 intercity diesel early in 1958. The Fuller T-75 transmission and a tandem rear axle with a 5.57:1 ratio were retained. This particular unit hauls approximately 52,000 lbs. gross and makes about 24 stops/day as it picks up milk from the individual farms. Round trip is about 180 miles a day including pick-up, trip to Baltimore and return. With the gasoline engine they were getting 4 mpg and with the diesel, 6 mpg. The newer International with a 2500 gal. tank was purchased with a gasoline engine in 1959 and repowered with a JN-130 before being placed in service. Operating in the same pattern as above it is getting 9 to 10 mpg carrying 2500 gals. of milk where a unit carrying 2000 gals. powered by a gasoline engine shows only 6-7 mpg. The F-54 Fuller transmission and 6.5-8.86 rear axle supplied originally were retained.

Another good example is contractor Nello L. Teer of Durham, N. C. who repowered a Ford model F-800 tractor used in crushed stone delivery with a C-160. According to Teer the Ford tractor pulls a 20 ton capacity trailer dump built specifically for crushed stone hauling, and its total gross weight loaded is 62,000 lbs. The unit makes eight stops daily and averages 280 miles/day. With the C-160 engine the truck is averaging 8 mpg compared to 4.75 mpg for similar gasoline powered trucks.

Perhaps one of the best examples of fuel economy in repowering is that reported by Lindahl Bros. of Chicago. In this case it was a standard 6 wheel dump Mack B42, used to haul sand, gravel, dirt and fill, that was repowered with a 160 hp Cummins diesel. Average running time on the truck is 9 hrs./day making 6 to 10 stops. With the new diesel, fuel consumption is averaging 13 gals./9 hr. day compared to a gasoline powered truck that is burning 26-28 gals./10 hr. day.

Motor Cargo, Inc. of Akron, a well known fleet operator is currently testing several makes of diesels in trucks used in in-city terminal delivery operations. In Sept., 1959, they installed a C-140 engine in a 45-50,000 GCW vehicle that runs 9 hrs./day with a diminishing load type haul.

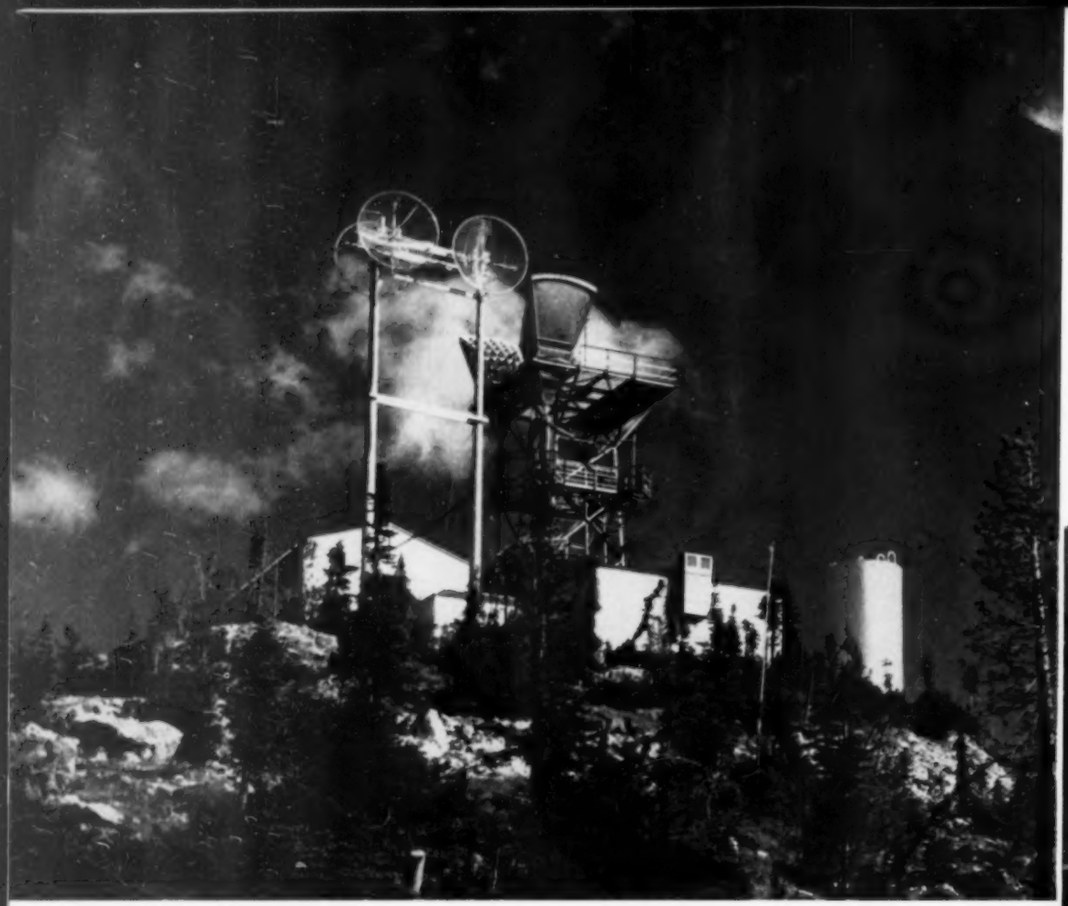


Performance curve of the C-105, 309 cu. in. displacement diesel.

Number of stops per day average 12 to 15, the average road speed is 40-50 mph, and average miles/day is 270. According to the Akron Company the C-140 is averaging 7.7 mpg, substantially better economy than the gasoline engine it replaced.

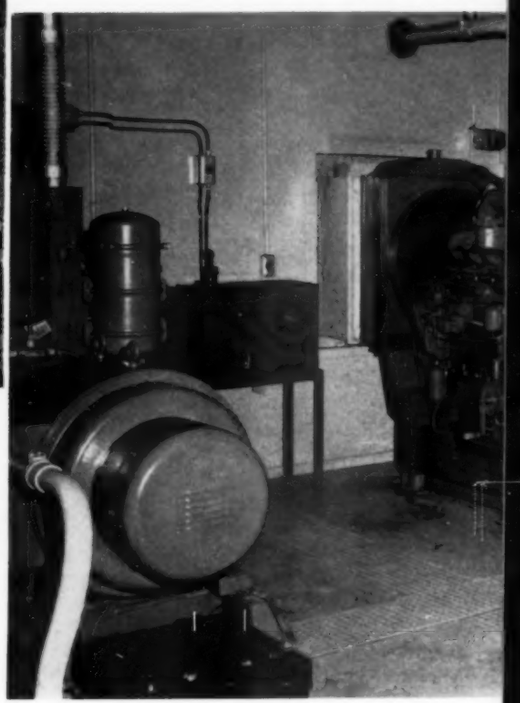
Cummins officials point to installations like these as indicative of the savings diesels offer operators of gasoline powered trucks. Certainly Cummins and the other engine manufacturers are opening up new areas of diesel application—and the operators they serve have only to look into the monthly operating statements to see the benefits.

B & B Milk Transportation's IHC COE 190 tank truck used for farm pickup of bulk milk for delivery to dairy. Unit was repowered with Cummins 130 hp engine. Average fuel consumption with full load (2500 gals.) is 9-10 mpg.



Salmo microwave station, entirely dependent on diesel-electric power, is atop a peak that is snowbound in winter. The round antenna at left is for equipment that automatically reports any trouble that may develop in the station. The main (triangular) antenna receives and relays telephone and TV transmission. Small building at right houses the three diesel engines and Kysor controls, the round storage tank holds 15,000 gals. of diesel fuel. Large building at left houses maintenance crews when they stay at station.

View of Salmo station engine room. One of the three engines is always in operation to supply all power for the station. The Allis-Chalmers DI-516 engines drive Kato-lite generators to produce 30 kw at 1200 rpm.



DIESELS GUARD, POWER TRANS-CANADA RELAY SYSTEM

By ROBERT J. FRITH

IT's a serious business for telecasters when TV screens fade out in the midst of a network program. It's far more serious if telephone circuits fail and long distance service is interrupted. Diesel generators prevent such calamities in the Trans-Canada microwave system that extends from coast to coast. They take over automatically when commercial power fails.' And at some remote points diesel sets run continuously as the sole power source. The Trans-Canada microwave relay system is a $50-million superline of communications built across 4,000 mi. of mountains, lakes and prairies from Newfoundland to Vancouver Island. It provides additional telephone facilities to supplement existing toll lines as well as channels for network television originating anywhere. Costliest and most difficult segment of this system was the British Columbia division. Mile-high mountains were scaled and their peaks used as relay points.

The Trans-Canada system itself is composed of seven large and five smaller communications systems, including British Columbia Telephone Co. That company employs part of the system for its own long distance telephony and leases part to the Canadian Broadcasting Corp., for TV transmission. The microwave system binds Canada with a communications chain that is blizzard-proof.

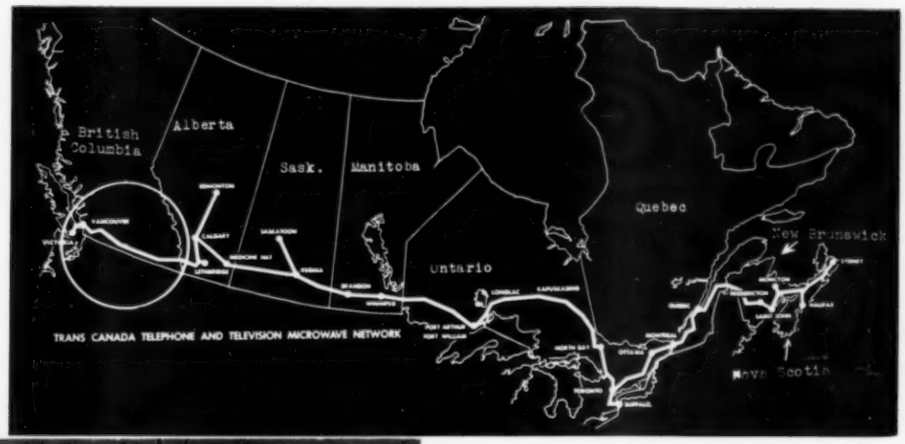
Allis-Chalmers diesel engines, driving Kato-lite generators provide standby and main power supply at the 20 stations in the B.C. Telephone Co., portion of the system. For standby service, Allis-Chalmers DI-344 4 cylinder diesels drive alternators at 1200 rpm to develop 20 kw. For the two posts where all electric power is supplied by diesel-electric sets, model DI-516 6 cylinder engines drive generators to develop 30 kw, also at 1200 rpm. The power plants were assembled in Vancouver by Simonson-Maxwell, Ltd. according to specifications furnished by telephone company engineers.

A great problem in British Columbia was to find sites for microwave stations that would permit unobstructed signal paths for the microwaves, which do not "bend" over the horizon. To clear intervening mountains, it was necessary to put the stations on the highest mountains along the microwave system. Because the peaks are so high, 7000 ft. and more, relay stations must run and monitor themselves and on occasion, actuate alarm controls in Vancouver and Nelson. Diesel engines were selected, along with sensing devices, because telephone engineers believed they gave the best assurance of continuous, dependable operation. There has never been an interruption in TV and radio transmission or in long distance phone transmission on the B.C. Telephone Co., portion, proof of the dependability of the diesel setups.

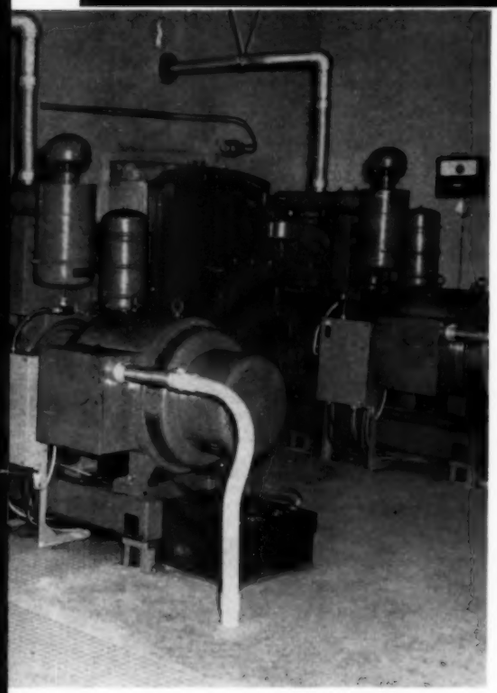
At 10 of the microwave stations, a single 4-cylinder diesel-electric set stands by to take over if commercial power fails. If failure occurs, the sets generate current for both the phone equipment and the rectifiers for charging the emergency batteries.

Two of the microwave stations, at Salmo and Blackwall, are so remote and inaccessible that service by commercial power was not feasible. So telephone engineers decided to rely entirely on diesel-generated power. Three Allis-Chalmers 6 cylinder diesel-electric sets were installed at each station to assure protection.

The Salmo relay station is located on Lost Creek Mountain, 18 miles east of the British Columbia town of Salmo. The station atop the 6900 ft. peak catches about every blizzard that crosses Canada and is reached with difficulty made more intense by rough winter storms. The Blackwall relay station in the Manning provincial park, is not much easier to reach.

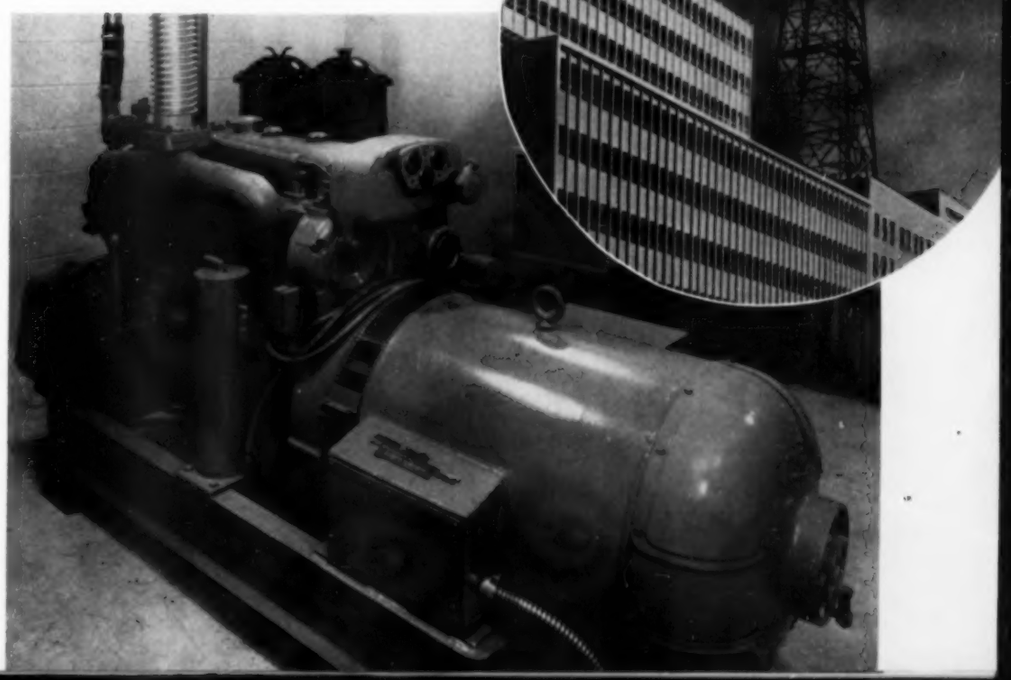


Map of Trans-Canada telephone and TV microwave network. British Columbia sector described in this story is within circle.



Tower atop B.C. Telephone Co. building in downtown Vancouver receives and transmits signals in Trans-Canada microwave system.

Importance of emergency power source was not overlooked in alarm stations on relay system. This set is in Vancouver center. It is a GM diesel driving a Delco generator. Set cuts in if commercial power fails.



technicians are dispatched by the station concerned. Once in the station, the technician can tell with a glance at the lighted control board what trouble caused the switchover.

Since none of the Trans-Canada stations are manned continually, all have sensing devices to report troubles to the control centers. The alarm system is capable of detecting 42 faults in the microwave system, 10 of which may be remedied by an attendant at the control station. Five of the controls in the alarm system guard engines and generators. One of these, and perhaps as important as any other, is a temperature control for the engine room. The engine's heat is balanced with outside air through automatic louvres which admit enough cool air to hold engine room temperature at 70 degrees. The four other controls monitor oil pressure, engine temperature, voltage and engine speed. These monitors detect each trouble as it occurs and signal the location on the control panel in the station.

Lube oil pressure is monitored by a pressure switch which, at low pressure, opens the electrical circuit of the shutdown sequence. Temperature control is carried out with a similar unit which detects high temperature, shuts down the set in operation and cuts in the next engine. Overvoltage is detected by the familiar voltage sensitive relay. Overspeed, which like overvoltage is considered unlikely by the telephone engineers, would be detected by a belt driven generator which operates a microswitch to start the shutdown sequence. All sensing device actuate the same control circuitry, which was developed by B. C. Telephone Co. engineers.

The relay stations in the B. C. firm's system are visited by technicians and diesel engineers at least twice a week, winter and summer. Snow on mountain roads is plowed by dieselized bulldozers. At one station, near Haney, workers reach the top of 1,100 ft. Grant Hill via a 10,800 ft. tramway driven by a diesel engine. For additional assurance, technicians live on the site during winter at Salmo, most difficult of the relay points to approach during the snow season. Crews are relieved every two weeks.

Principal Equipment Serving Microwave System, B. C. Telephone Co., Segment

Engines	Allis-Chalmers
Generators	Kato
Lube oil filters	Luber-finer
Fuel oil filters	CFC Fulflo
Louvre controls, engine room	Minneapolis-Honeywell
Shutdown contractors	Kysor
Emergency diesel set	General Motors

At both the Salmo and Blackwall stations, one diesel set operates continuously with the other two on standby. Bob Simpson, district maintenance foreman in Vancouver, reports that diesel engine performance has been 100 per cent efficient. The Allis-Chalmers engines, rated 90 hp at 1200 rpm, are operated in rotation, with one on the line at all times. Engines are kept about 2000 hrs. apart so that head changes or major overhauls will not be required on more than one engine at any one time. Twenty-four hr. diesel operation results in a daily fuel consumption of 50 gal. Tanks at each of the two stations have capacities of 15,000 gals. enough for a year.

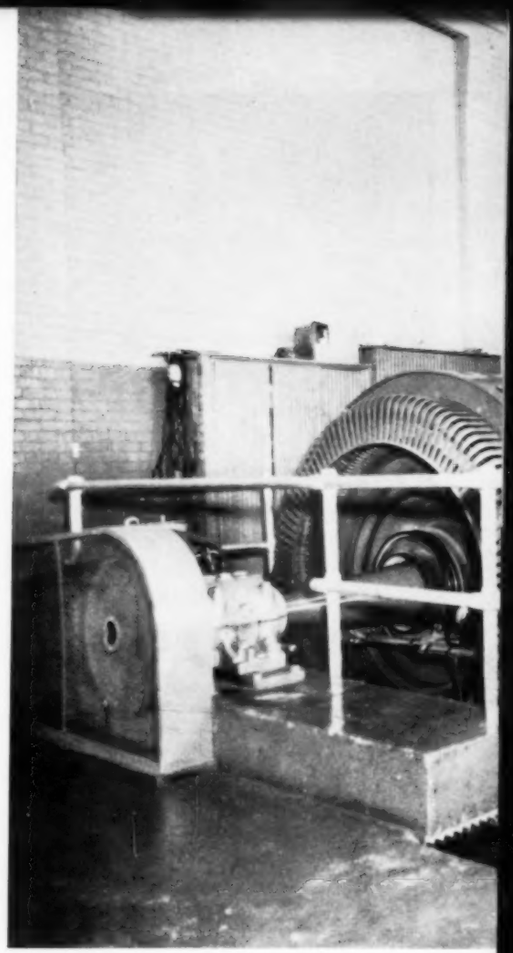
If the unit on the line should fail, automatic sensing equipment cut out that engine and cut in the next diesel set. A second failure from any cause would activate the no. 3 unit before the batteries take over. The instant the first failure trips the automatic switch, an alarm signal transmitted by a separate microwave system, sounds in central control, at Vancouver in the case of the Blackwall station, at Nelson if it's the Salmo relay station that needs attention. Line crews and microwave

TULIA, TEXAS DIESELS WRITE A LOW COST STORY

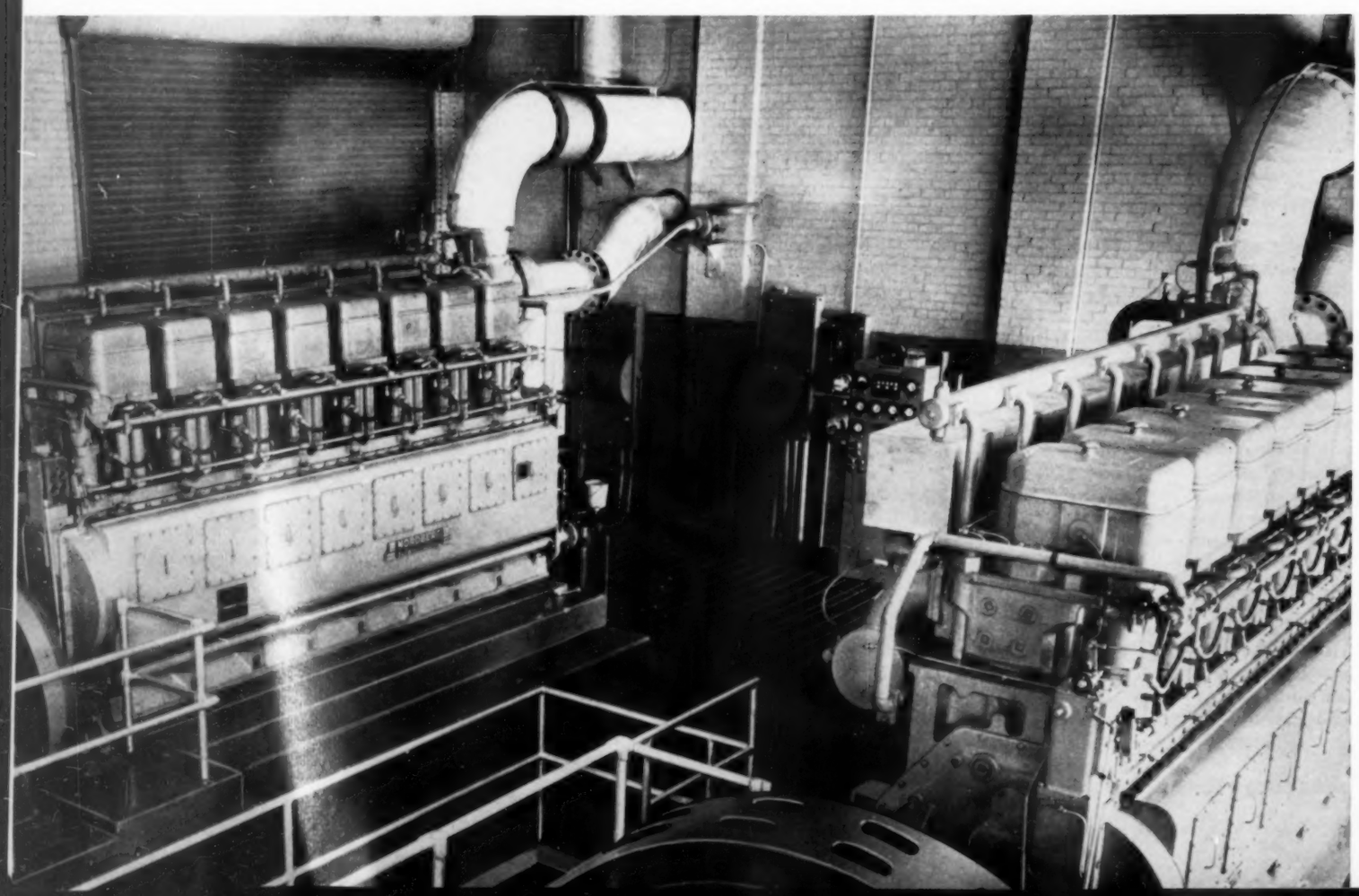
Pair of 1600 HP Nordberg Dual Fuel Engines Installed In 1957 Reduce Fuel Cost to 2.86 Mills Per KWH; Turn Out 91.3 Per Cent Of Total Plant Output

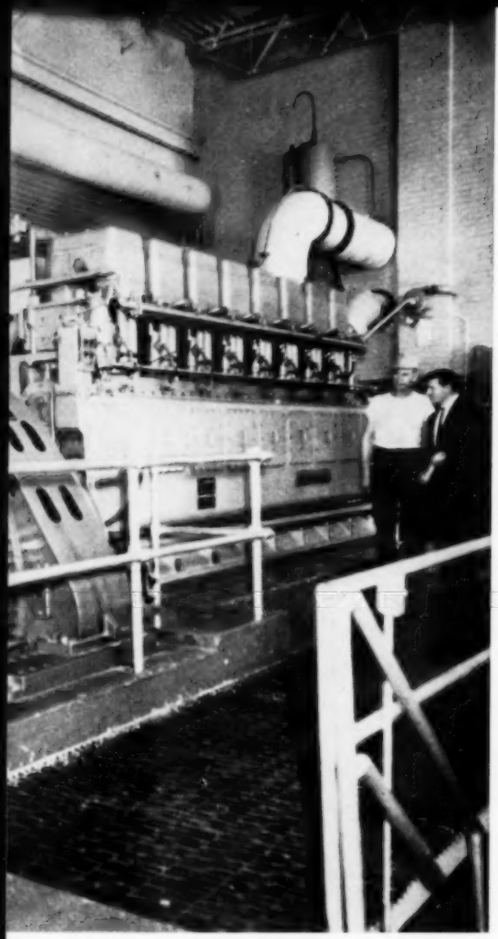
A PAIR of 1600 hp Nordberg engines have turned in an impressive operating story in the Tulia, Tex., municipal power plant. Since installation in 1957, the 4 cycle Supairthermal engines turned out more than 90 per cent of plant output and effected substantial savings in production costs. In the fiscal year ended September 30, 1958, their first full year of service, the two Nordbergs turned out 8,349,000 kwh, 91.3 per cent of the 9,144,500 kwh plant total. Performance of the new engines reduced plant fuel cost nearly a mill to 2.86 mills per kwh. Additional savings on lube oil, maintenance and supplies cut another mill, bringing total operating cost down to 5.6 mills per kwh. Comparisons are with the 1955-56 year, the last before installation of the Nordbergs.

Tulia is a community of 4,600 in the heart of the Texas panhandle. It is the largest city and county seat of Swisher county, 888 sq. mi. of rich farm land devoted to sorghum, wheat, cotton and prize livestock. In 1911, Tulia citizens voted to build an electric power plant and the first 80 kw steam engine was installed. The modern plant had its beginning in 1923 with installation of two 100 hp internal combustion engines. The plant enjoyed two periods of expansion, first in the 20's with installations in 1923, 1924, 1927 and 1929. Then followed a lull because of the depression, then unavailability of equipment during the war. Expansion resumed at an accelerated pace in the postwar years with installations in 1946, 1949 and 1953. At that point, the plant had five engines

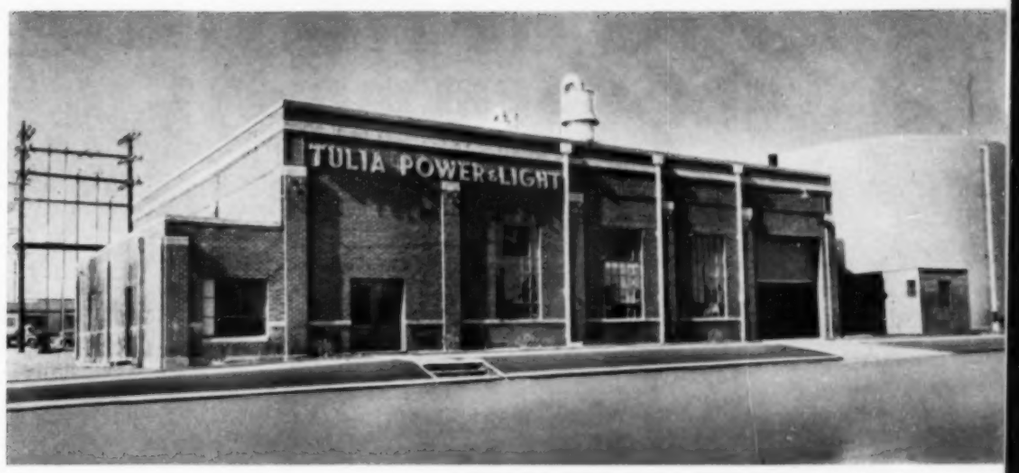


These two Nordberg Supairthermal Duafuel diesel engines produced 8,349,000 kwh and reduced plant average fuel cost to 2.86 mills per kwh in their first full year of operation. Engines are equipped with Elliott turbochargers, Bendix Scintilla fuel injection pumps, Winslow lube oil filters and, Young lube oil cooler and intercooler.





Power and Light Superintendent Amos Newby and City Manager Jim White discuss performance of the two 1600 hp Nordberg engines which handle over 90 per cent of the plant load. Production costs have been cut 26 per cent since the engines were installed in 1957. The units drive Electric Machinery alternators.



The Tulia, Tex., power plant has served the city from this site since 1923.

with a combined capacity of 3,890 hp. Three burned natural gas and pilot oil.

In 1955 the city retained Carl C. Cox of Amarillo as consulting engineer to survey needs and supervise plant expansion. Citizens approved the recommended program and the city contracted for a new engine and took an option for a second. A surge in demand indicated the second engine would be needed sooner than expected and the option was exercised immediately. The engines chosen were a pair of 4 cycle Nordberg Supairthermal Duafuel diesels. Each has eight cylinders, 13 in. bore and 16½ in. stroke, and is rated at 1600 hp at 450 rpm. The Supairthermal design incorporating turbocharger and intercooler, provides a larger charge of cooler air for the cylinders, permitting greater power output and efficiency without increasing peak pressures and temperatures. The engines operate on natural gas with a small quantity of pilot oil. Each drives an 1135 kw, 1419 kva, 3 phase, 60 cycle, 4160 volt alternator with 15 kw belt driven exciter. Plant voltage was switched from 2400 to 4160 when the new engines were installed.

Put into service in 1957, the new Nordbergs made a substantial contribution in the fiscal year ending in September of that year. The No. 6 engine ran for 2,371 hr. and produced 1,850,000 kwh while the No. 7 unit ran 1,617 hr. and produced 1,193,000 kwh. In the fiscal year ending Sept. 30, 1958 the No. 6 engine ran 5,705 hr. and turned out 3,980,000 kwh. The No. 7 unit was top producer, operating 6,231 hr. and generating 4,369,000 kwh. The three older dual fuel engines contributed an aggregate of 793,600 kwh and the other two oil burning diesels added just 1,900 kwh.

Gas consumption for the entire plant for the last fiscal year was 96,934,000 cu. ft., an average of 10.60 cu. ft./kwh. This compares with an average of 11.26 cu. ft./kwh for the three older dual fuel units in 1955-56. Similarly, the average consumption of pilot oil for the plant in 1957-58 was .00686 gal./kwh, compared with .0090 gal. in the 1955-56 year. The new engines clearly were responsible for the gain, for No. 6 averaged .00616 gal. and No. 7 averaged .00627. In terms of fuel economy, the effect of the new installations was even greater, natural gas replacing virtually all the oil used by straight diesels to produce 804,700 kwh in 1955-56.

Even with gas at 20.5 cents per 1000 cu. ft. and oil at 10 cents a gallon, the savings add up to a handsome dividend. In 1955-56, fuel cost for the plant averaged 3.81 mills per kwh. In 1957-58, gas cost 2.17 mills and oil 0.69 mills for a plant average fuel cost of 2.86 mills per kwh. This meant a saving of 0.95 mills or 24.9 per cent. Fuel savings are not the whole story. The new engines are sparing indeed in their consumption of lubricating oil. The No. 7 engine used only 696 gal. of lube in 6,231 hr. of operation in 1957-58, an average of 14,324 rated hp hrs. per gal. of lube. The No. 6 topped even this mark, consuming just 572 gal. in 5,705 hrs. on the line for an average of 15,958 hp hrs. per gal. This resulted in a cash saving of $1,600 despite substantially higher production in the later year. With additional savings in maintenance and supplies, the plant produced a kilowatt-hour in 1957-58 for just 5.6 mills (including fuel, lube, labor, maintenance and repairs, supplies and miscellaneous). This compares with 7.6 mills in 1955-56, a reduction of more than 26 per cent. The efficiency level was achieved by the new engines while operating at an average load factor of 62 per cent. It should also be noted that engines at Tulia work at an elevation of 3,500 ft. Installation of two 1135 kw units, raising plant capacity from 2523 kw to 4793 kw, a boost of 90 per cent, was the largest single expansion in plant history but clearly was necessary. If the new engines had not gone in, it would have taken everything in the plant running at capacity to carry the 2500 kw peak in August last year. This year, it is expected that peak demand will exceed 3,000 kw. At this level, both new units are required to provide firm capacity. Also, the two Nordbergs provide a reserve to handle some additional load development.

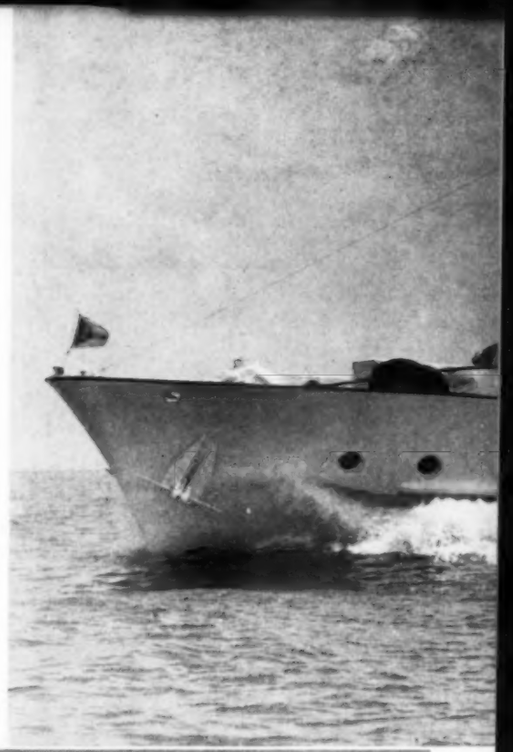
Tulia's power plant has been a profitable municipal enterprise. In the 1957-58 fiscal year, it cost just $82,495 of the total $216,286 in revenue for the production and distribution of electricity. Another $57,734 went to pay interest and principal on bonds. Of the remaining $76,056 the city used $15,000 for capital improvement of the street lighting system, $20,000 for expansion of the electric distribution system and $40,000 for the general fund to pay government expenses and thereby reduce taxes. In addition, the plant supplied all electricity for street lighting without charge. Tulia power and light superintendent is Amos Newby who started as an operator at the plant in 1926. Guiding financial management of the department is City Manager James White. Mayor John Brown and the board of aldermen devote long hours to policy formation and supervision.

Principal Equipment—Tulia, Texas

Engines	Nordberg
Alternators	Electric Machinery
Governors	Woodward
Fuel Oil Injection Pumps	Bendix Scintilla
Fuel Oil Transfer Pumps	Roper
Lube Oil Filters	Winslow
Lube Oil Cooler	Young
Intercooler	Young
Cooling Towers	Young
Air Intake Filters	American Air Filter
Air Compressors	Quincy
Pressure Gauges	Lonergan
Vacuum Gauges	Meriam
Switchboard	General Electric
Pre Lube Oil Pump	DeLaval Steam Turbine
Turbochargers	Elliott
Pyrometers	Alnor

DIESELS CUT FUEL COSTS, INCREASE SPEED OF YACHTS

By ED DENNIS



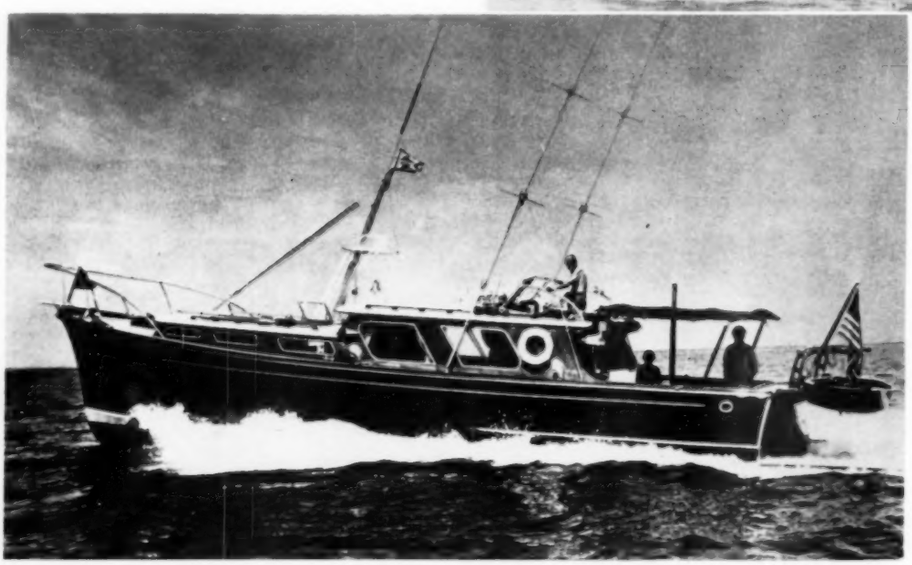
MANY of Florida's boat builders are known the world over for their designs. This, combined with top engineering ideas from the nation's leading marine diesel engine manufacturers, makes Florida's coastline a Mecca for yachtsmen. There is more to a craft than streamlined design and luxurious appointments. One of the most important questions is: "How will it perform?". This question can only be answered when the craft and its propulsion engines are considered as one. The two are inseparable. And every year, more and more diesel engines go into more and more yachts. During the past year, several Florida based yachts caught my attention, each with a different type of diesel engine. The following are brief descriptions of craft I feel merit attention:

The *Sands of Time* measures up to be one of the finest yachts of its class in Florida waters. This 49 footer possesses all the features required for a sturdy, dependable craft for satisfying deep sea fishing. The seagoing beauty is of American design but was built in Nieuwendan, Holland in 1958. It measures 49 ft. long, has a beam of 14 ft., 6 in. and draws two and one-half ft. of water. Recently repowered from gasoline engines with the first production-line pair of GM 8V-71 diesel engines in the south, she now cruises at 20 knots against the old 13. Requirements of the owner, William Bradford of Middleboro, Mass., included spacious accommodations and ability to cruise and fish offshore in deep water. The engines are eight cylinder, two cycle, liquid cooled with a bore and stroke of 4¼ in. x 5 in. and have a displacement of 567.4 cu. in. The engines are rated 308 shp at 2300 rpm and 227 cont. hp at 1800 rpm. Power is delivered to the 24 in. x 26 in. propellers through Allison 1.1:1 hydraulic r&r gears to give the yacht a new speed of 26 knots at 2500 rpm and a cruising speed of 20 knots at 2000 rpm against 13 knots at 3900 rpm and 15 knots at 4400 rpm with the old 250 hp gasoline engines.

This newly designed engine is extremely light (just over 3000 lbs.) and takes up considerably less space than the old engines. Gasoline consumption was 26 gals. at 3900 rpm and 38 gals. at 4400 rpm compared with 18 gals. of fuel oil at 2000 rpm and 24 gals. at 2400 rpm with the new GM diesel engines. Repowering the *Sands of Time* was done in the marine facilities of Ellis Diesel Sales & Service on the New River at Ft. Lauderdale.

Capt. Art Robinson of Pompano Beach has his *Vera II* at the Hillsboro Inlet docks. This 46 footer has a pair of DKB135 Waukesha diesel engines. Built by Chris Craft in 1947, she was rebuilt by Chris Boat Works of Miami in 1958 and recently repowered from gasoline to diesel engines for a daily fuel savings of $17.25. The *Vera II's* twin 6 cylinder Waukesha engines develop 124 hp at 2000 rpm, transmitting power through 2:1 Capitol hydraulic reduction gears and 24 in. x 24 in. propellers to give the craft a speed of 18 mph. The diesels feature the special Waukesha combustion chamber, have aluminum pistons and a bore and stroke of 4¼x5 in. Piston displacement is 426 cu. in. New fuel consumption is 18 to 25 gals. of fuel oil at 22 cents a gal. compared to 40 to 65 gals. of gasoline at 35 cents a gal. for a full day's run. On speed trial runs, the *Vera II* did 19 mph at 2200 rpm (133 hp) and cruised at 15 mph at 1900 rpm (118 hp), about the same as the old 160 hp gasoline engines. Engineering and installation of the engines was by Simplex Sales Co., Miami.

Another diesel engine gaining popularity with Florida yachtsmen is the compact Allis Chalmers model 6DAMR273. One was installed in the 30 ft. fishing cruiser, *Gull* owned by Malcom Matheson, member of a prominent pioneer South Florida family. This 76 hp diesel replaced a 140 hp gasoline engine for an increase in speed and drop in fuel consumption. The *Gull*, measuring 30 ft. x 8 ft. was designed for family cruising plus fishing and is used by Matheson for short range fishing trips along the Florida coast. The model 6DAMR273 Allis-Chalmers marine diesel engine was installed by the Dinner Key Division of Merrill Stevens Drydock Co. The engine is a 6 cylinder, 4 cycle diesel with bore and stroke of 3¾ in. x 4⅛ in., a displacement of 273 cu. in. and transmits power through 2:1 Capitol manual reduction gears.



The 49 ft. *Sands of Time* built to get to the fishing grounds with speed and riding ease. Propulsion for the repowered craft is provided by a pair of General Motors 8V-71 diesel engines each rated 308 shp at 2300 rpm. Its new speed is a top of 26 knots at 2500 rpm.

The *Flying Fish II* was built and launched on the Miami River by Chris Boat Works for J. M. Christiansen. This 42 ft. sportsfisherman cuts the blue coastal waters at a top speed of 25.5 mph and cruises at a comfortable 21.4. S. Christiansen, its designer, has created a blend of modern styling, comfort and high speed. The boat is powered by a matched pair of General Motors 4-71 turbocharged two cycle diesel engines having a bore and stroke of 4¼ x 5 in. and a displacement of 283.7 cu. in. Addition of the single stage turbocharger gives this engine a rated shp of 197 at 2300 rpm. Its pair of 23 in. x 19 in. propellers are turned through Paragon 1.5:1 hydraulic reduction gears. Fuel consumption averages 9 to 10 gal. per hr. for each engine. Cruising range is 200 to 250 mi.

Another General Motors dieselized Chris built sportsfisher recently launched is the *Flying Tiger* for William D. Pawley of Miami. It measures 46 ft. and has a pair of inclined GM 6-71 marine diesels with 2:1 Allison hydraulic r&r gears for propulsion. A model 180 DLC Waukesha powers the 10

The *Dutch Eagle* flying the quarantine flag as she enters the harbor at Fort Lauderdale, Fla. after completing a 7495 mi. trip from Holland. Powered by a pair of D326 series F Caterpillar marine diesel engines, this yacht is an outstanding example of luxury afloat.

The 46x11.9x3 ft. *Vera II* shown inbound through the treacherous Hillsboro Inlet at Pompano Beach, is owned by Capt. Art Robinson. Craft was recently repowered from gasoline engines to Waukesha 124 hp diesel engines for a daily fuel savings of about $17.

kw Kohler generating set which supplys current for the air conditioning plant.

Over on Florida's west coast, the 28 ft. pleasure fishing craft *Mitch* was built to get to fishing grounds with speed and riding ease. The craft, owned by H. R. Mitchell, of Tampa, has two 96 hp Ford diesel engines for propulsion. These 6 cylinder 330 cu. in. heavy duty diesel engines were converted to marine use by Modern Diesel Power Co. of Tampa. The Ford diesels transmit their power through direct drive Paragon clutches to give the *Mitch* a top speed of 31.5 mph.

Luxury afloat is the big new yacht owned by George Needham. This 72 ft. beauty is the *Dutch Eagle* and is powered by a pair of D326 series F Caterpillar marine diesel engines. Mr. Needham helped design the craft, supervise its construction, and select the two 200 hp (at 2000 rpm) engines. Then he skippered it across the Atlantic on a 7495 mi. maiden voyage from Holland to Ft. Lauderdale, Fla., her winter season berth.

Built under Lloyds survey class 100 A1 for seagoing yachts, the *Dutch Eagle* is divided into four watertight bulkheads. Below the engine room and cabins are double bottom fuel tanks with a capacity of 2500 gals. plus a 350 gal. fresh water tank. An additional 350 gals. of fuel oil is carried in the engine room tanks. Fore and aft water tanks hold 340 gals. and 700 gals. respectively.

The *Dutch Eagle* measures 72 ft. x 17 ft., 6 in. with a draft of 5 ft., 1 in. The Caterpillar model D326 marine engines drive the props through a Twin Disc 1.96:1 pneumatically operated r&r gear. The 6 cylinder, 4 stroke diesel engines have a bore of 5 1/8 in. and stroke of 6 1/2 in.

The *Flying Fish II* built by Chris Boat Works for Jack Christiansen of Miami Shores and powered by a pair of General Motors 4-71 turbocharged diesel engines which push the craft at 25.5 mph at 2300 rpm. The engines were supplied by GM Diesel's Miami office.

WHAT'S GOING ON IN ENGLAND

CONDUCTED BY **BERNARD W. LANSDOWNE**

Bernard W. Lansdowne is an associate member of the Institution of Mechanical Engineers and is widely known among British and European diesel manufacturers as a former editor of our English contemporary "Gas & Oil Power." His early workshop training was spread over seven years with A.E.C. Ltd., Southall, following which he served some five years with that company's sales engineering department. He is now manager-for-the-United Kingdom of a group of business and technical publications.

A New Approach To Bearing Lubrication

At the invitation of one of Britain's major engine bearing design and manufacturing organizations, I recently attended the presentation of a documentary motion picture which introduces a novel and interesting new approach to the problem of increasing engine bearing capacity.

The film was presented by the Glacier Metal Co. Ltd. of Alperton, England and it shows details of development work which led to the design by that company of a system of supplementary bearing lubrication which they call Ramrod. Introduction of this lubrication system has arisen from fundamental research by Glacier carried out on a test rig of their own design which can simulate all the loading conditions normally imposed upon the crankshaft bearings of either four stroke or two stroke engines. Bearing material in the rig is transparent enabling behaviour of oil film in the bearing to be directly observed and recorded on film.

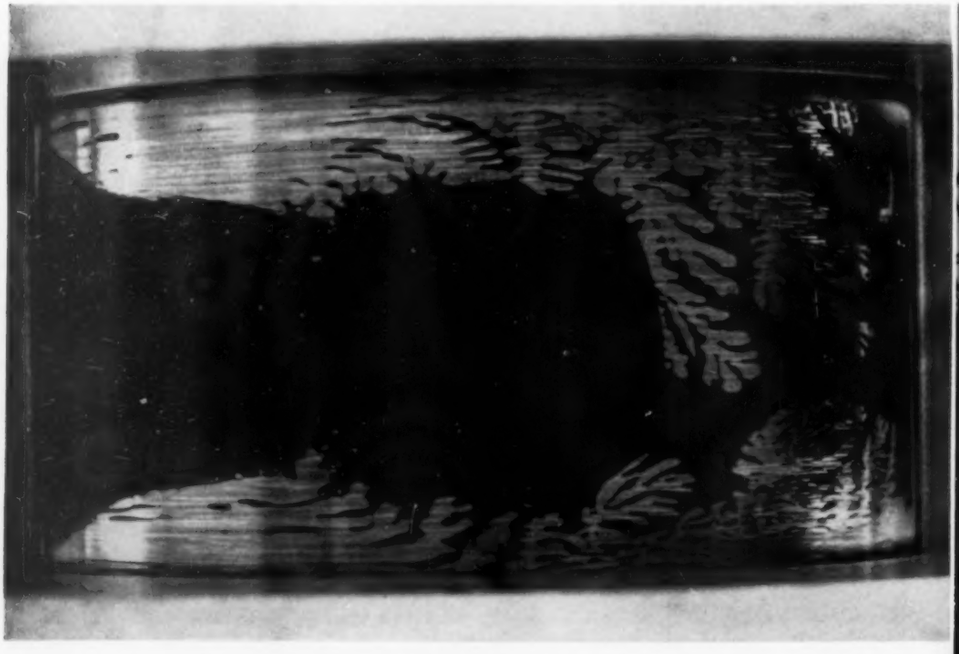
Realistic loading on the bearing is achieved by applying pressure to it from a cylinder in one plane, with a second cylinder providing pressure at right angles to generate transverse loads. Pressure in these cylinders can be varied by cam mechanisms coupled to the main shaft which can be set to reproduce on the rig any polar load diagram produced by an actual engine in every day performance. These polar load diagrams can be observed on an oscilloscope screen on the rig.

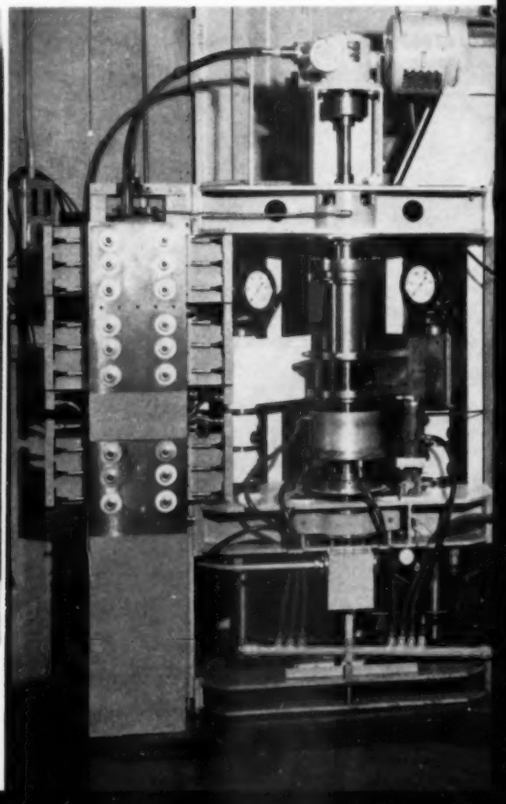
To facilitate direct observation of the oil film behaviour the shaft has to run at very low speeds. Accordingly the bearing load, oil viscosity and the inlet oil pressures have all to be adjusted, in line with accepted textbook principles, so that the whole set up runs under dynamically similar conditions to those typical of a big-end bearing running in an actual engine.

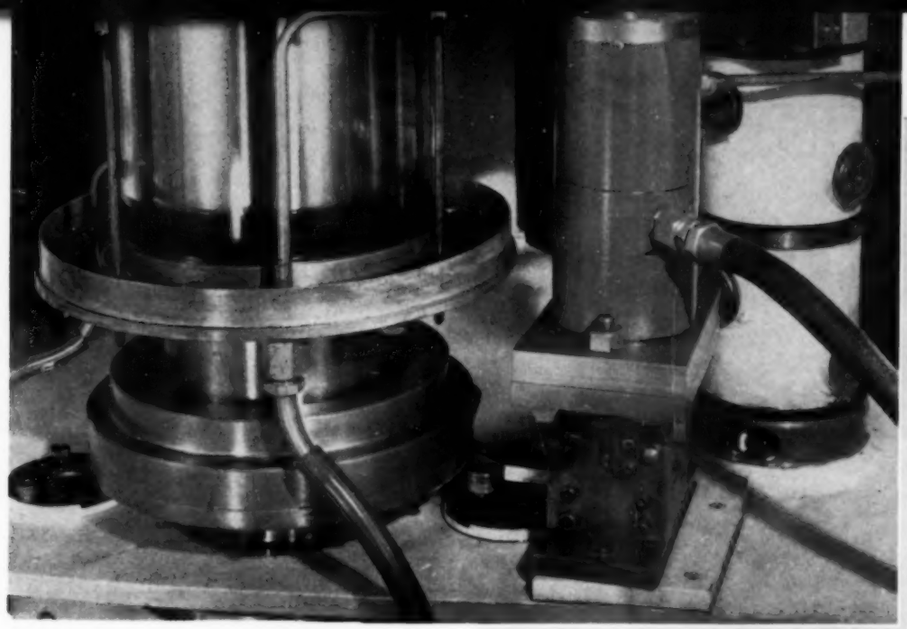
The film shows that by applying typical loads to the bearing and observing the behaviour within the cap half, pressure on the firing stroke drives the cap away from the shaft and its oil film collapses owing to cavitation. This may well be construed to be of little consequence since the load is then being carried in the top half of the rod, but unfortunately the area of cavitation is seen to rotate at about half the shaft speed. In due course, therefore, in the glacier film it turns up on the pressure side with the result that on the rod side the bearing material receives the full force of the firing load at a time when only a fraction of its area is protected by the oil film which is supposed to separate it from the crankshaft.

This was observed clearly in the Glacier film which showed the cavitation moving round into the rod half before the firing stroke, probably helped on its way by the fact that at this moment the inertial forces may be greater than the compression forces resulting in increased clearance between the rotating parts on the rod side. This phenomenon, Glacier claims, leads to a type of bearing failure associated with incomplete lubrication and is typical of that that can result from cavitation.

Typical cavitation seen in transparent bearing under cyclic loading on the bearing oil film analyzer.



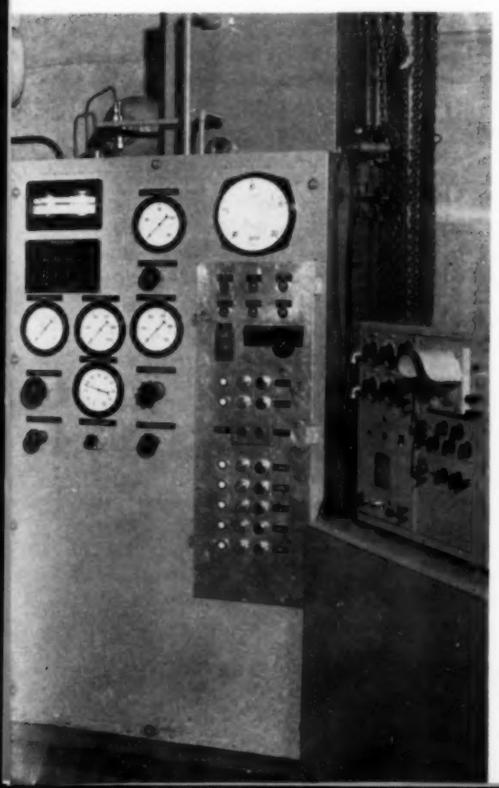




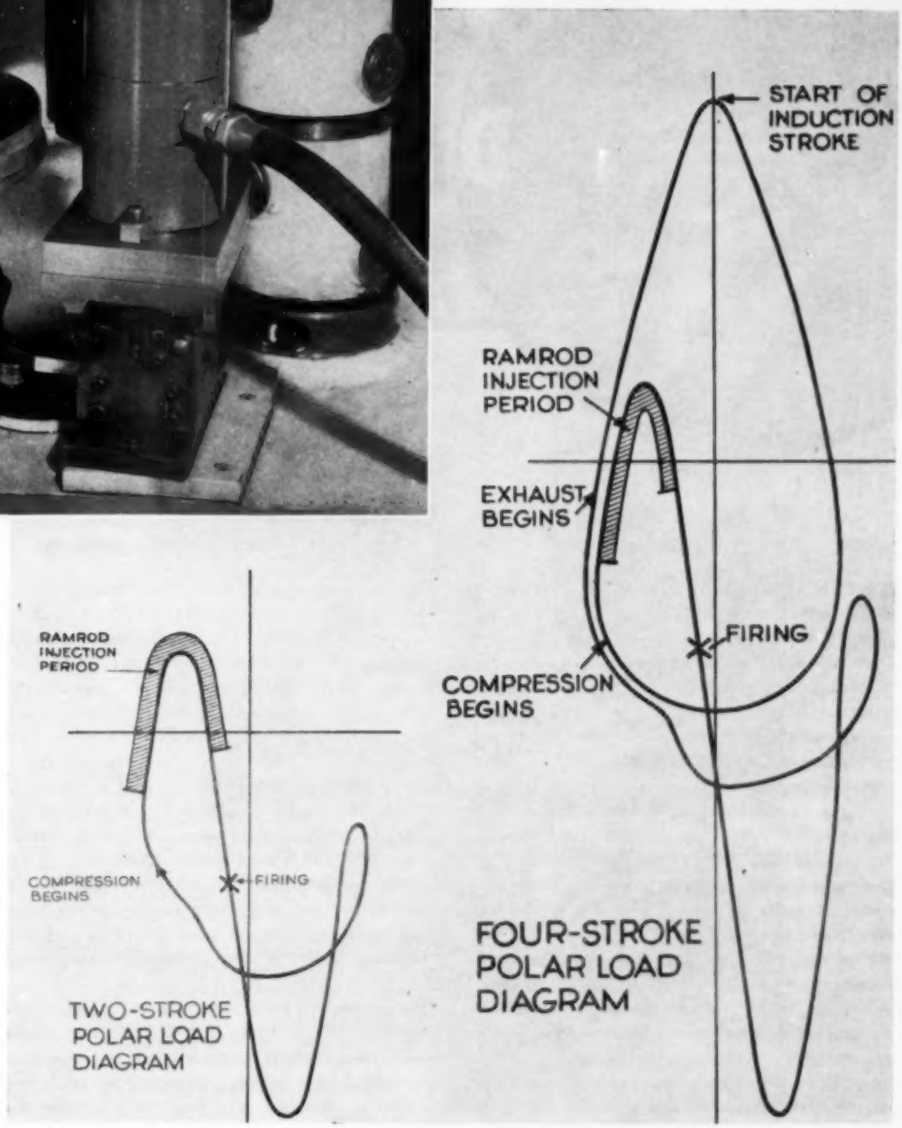
The Ramrod injection pump installed on the bearing oil film analyzer supplying oil to the transparent bearing.

The position of the lubricating oil exit hole in the crankshaft is shown in the film to materially affect cavitation, and tests were made first to show what happens with the hole in the conventional position, namely top dead center. Filming the shaft as it rotates through the cycle of firing—exhaust—induction—compression and so on, it was seen that the disruption of the oil film occurred markedly just prior to the firing point. By advancing the oil hole to a position 40 degrees ahead of dead center it was found that this situation could be improved somewhat, but even with the hole in the optimum position possible there is still substantial cavitation.

It is to overcome these problems that Glacier introduced the Ramrod system of lubrication which



A general view of the Glacier bearing oil film analyzer.



The chosen moment for Ramrod in relation to the polar load diagram on four and two stroke engines is shown above.

consists essentially of an injection pump which rams high pressure oil into the bearing just before the firing load. On an actual engine running at say 500 rpm the Ramrod pump pressure would rise to around 900 psi and it could indeed be higher than this on smaller engines running at faster speeds. On the test rig of course these pressures are adjusted to correspond with the other prevailing test conditions. The film then shows precisely the sequence of events and the behaviour of the lubrication during the whole cycle of operations which is "Ramrod"—firing—exhaust—induction—compression, and so on for a four stroke engine. It was seen that each time the Ramrod lubricator intervened the space caused by cavitation is filled with oil and, of particular importance, this always occurs just before the firing load.

In the case of the two stroke bearing nearly all the cavitation in the cap half is carried round into the rod half for the next firing load and even with the oil hole in its best possible position (40 degrees ahead of top dead center) the film shows that cavitation occurs before each firing stroke. The application of Ramrod gives an operating sequence of "Ramrod"—firing—"Ramrod"—firing etc. and it was seen that the clearance space in the bearings was again filled with oil before each firing stroke.

No commercial application of this new system is yet available, but a number of engine manufacturers are believed to be very actively interested in it. In pursuing the economics of Ramrod, I learned that one pump per big end and one pump per main bearing, i.e. 13 pumps on a 6 cylinder engine are required. Glacier's are confident however, that its use will facilitate shorter, lighter and cheaper engines for a given power than anything today possible. The installation cost for the Ramrod system when added to the total price of an engine they claim can still give substantial savings in dollars per bhp. Power requirements for the Ramrod system on medium sized engines is given as 2 hp and such factors as the provision of oil-cooled pistons have been taken into consideration in the design of the system.

DIESEL SERVICE PROGRESS

A COMMENTARY BY **GEORGE R. MACKEY**

George R. Mackey was long associated with Detroit Diesel Engine Division of General Motors Corp., and had prior experience as a mechanic in Europe and the U.S.A., which enabled him to become well acquainted in the diesel and service fields and to obtain a broad scope of the service industry from the customer's and management's viewpoint. Further training at Carnegie Tech and in the Army Ordnance during World War II provided the necessary requirements in planning service programs. Progressive advancement in diesel service areas in General Motors and with Detroit Diesel led to his position as Supervisor of Service Promotion. Upon termination of employment with General Motors in 1952, he joined Clayton Manufacturing Company, and his present position with this organization is Sales Manager of the Dynamometer Division.

Torque And Horsepower

DEVELOPMENT of the internal combustion engine and rapid acceptance of the diesel engine over other types of prime movers in a great many new applications has been accompanied by varied claims and counterclaims relative to engine performance characteristics. So much so, that a certain amount of confusion and misunderstanding often exists. These claims and resulting misinterpretations by the uninformed, have led to a complete misunderstanding of the terms torque and horsepower. Mis-application of these common terms as they apply to the modern engine may make one wonder just what it is that turns the wheels of industry—torque or horsepower. Very often those concerned with the service and repair of engines, or those called upon to provide training programs for mechanics, operators, and testers, are required to give an understandable interpretation of these two common terms. Salesmen and servicemen, in their eagerness to serve, often misapply the terms torque and horsepower. They use the term torque to imply work performed or a rate of power, and use horsepower when discussing the torque charactertistics of an engine. This situation is especially prevalent when engine performance charactertistics are applied through a gear box or torque converter.

Torque is a twisting or turning effort and should not be confused with work or power, as no work is performed or power developed until a distance and time factor is applied. Torque is applied when an attempt is made to loosen the top of a screw top jar; but no work is performed until the top is actually loosened. Likewise, a man can exert pressure by pushing against a heavy object simulating torque, but no work can be measured until the object is moved a specific distance in a prescribed amount of time. As it applies to an engine, torque is the twisting effort that is applied through the crankshaft to driven members, such as the output shaft of a power unit or the wheels of a truck.

Power is something altogether different than torque. It is the rate at which an engine works. It is energy expended which is the product of force and distance. Power and work both indicate motion. Torque does not involve motion; it is merely the twisting or turning effort which may or may not result in motion. With torque in motion, we have the basic ingredients to determine horsepower. Torque is measured in pound feet, (lbs. ft.) which is the pressure or twisting effort applied to an arm or lever of a known length. For example, if 20 lbs. pressure were exerted on a crank two ft. long (from the center to the handle), the applied torque would be 40 lbs. ft. This applied torque would continue, whether the crank turned or not, as long as the pressure exerted remains constant. Torque is a very necessary factor for determining engine horsepower, but it does not provide a complete measurement of performance until a time or speed (rpm) factor is included.

Horsepower is a measurement of power developed. When man first invented machines to produce power and perform useful work, he realized that he needed some means of measuring the machine's ability to produce power. Since the horse was the standard means of motive power at that time, it was only natural that the power developed by the machine should be compared to the working ability of a horse. For example, a 20 hp engine could perform the work of 20 horses. As engine developments continued, it was necessary to define more accurately the horsepower as a unit of measurement. This resulted in the establishment of a numercial value involving weight, distance, and time.

The fact that one hp was determined as the ability to lift 33,000 lbs., one ft. in one min., is relatively unimportant to us today. But the fact that this established value consisted of three factors—weight, distance—time, is of major importance as it is the basis from which we measure engine performance today. The term "brake-horsepower" which is commnly used, came from use of the prony brake which was once widely used to measure engine power output. Today, most manufacturers, research laboratories, and many service operations, use accurate dynamometers offering infinite variable control of a wide power and speed range to measure engine power. Regardless of the type of dynamometer used, the same basic formula involving weight—distance—speed, is still used. This basic formula today is shown as $\frac{t \times rpm}{5250} = hp.$

With this formula and by rearranging the factors, we can easily determine any characteristic of engine performance. When we know the torque and rpm and apply them to a known constant (5250), it is a simple matter of mathematics to determine the horsepower. Likewise, by knowing the horsepower and rpm and applying the same constant, we can easily rearrange the formula to compute the torque $\frac{hp \times 5250}{rpm} = t.$ Horsepower, then, is the movement of a measured weight over a definite distance within a specified interval of time. As previously covered, this is numerically equal to 33,000 ft. lbs./min., or the ability to lift 33,000 lbs., one ft./min. or 550 lbs./second. When we rate an engine at 200 hp, we are saying that it can perform the work of 200 horses and that it is capable of developing 6,600,000 ft. lbs./min., or any combination of weight, distance, and time equalling the same value.

Generally, an engine installed in any application will provide somewhat less than its rated power as productive or usable horsepower because some of the power is required to operate such accessories as fan, or generator. In truck applications, a portion of the engine rated horsepower is used to overcome the friction of transmission gears, differential and the friction of the tires. For test purposes, most diesel engine manufacturers give the conditions under which the engine will develop its rated power and the percentage of rated power guaranteed. Most engines are guaranteed to develop not less than 95 per cent of the advertised rated power at specified test conditions. With but one or two exceptions, the S.A.E. rating of 29.92 in. Hg (Mercury) Barometric, the equivalent to sea level, and 60 degrees F. air temperature, are standard ratings at which an engine will develop its guaranteed rated horsepower.

For truck applications, because of the many variables involved, a rule of thumb is generally applied as a guide to determining that portion of the engine rated horsepower which is available to drive the wheels and perform productive work.

This rule of thumb for a single axle truck is that 70 per cent of the engine rated horsepower can be measured at the wheels in terms of rear wheel horsepower. If a tandem drive rear axle is involved, the additional friction in the tandem drive mechanism and the rolling resistance of the tandem drive tires will result in 70 per cent less 8 to 10 horsepower. In other words, it is not the rated horsepower of the engine but that portion of it transmitted to the drive wheels which determines the ability of a truck to transport materials.

When applying the rated horsepower of a given engine to a transmission or gear box, the horsepower does not change, except for the negligible amount required to overcome the friction of the gears. The torque and output speed of the gear box shaft changes with the gear ratio. For example, an engine which is rated at 200 hp at 2000 rpm, and developing 550 ft. lbs. torque, when driving through a 2:1 gear box, will still be developing 200 hp at the gear box output shaft, but the output torque will be twice that of the engine, or 1,100 ft. lbs., and the shaft speed one-half that of the engine, or 1,000 rpm. Regardless of the type of engine or the purpose for which it is used, horsepower measures the weight–distance–speed ability of the unit and is a fixed value which remains unchanged.

Product Sales Manager

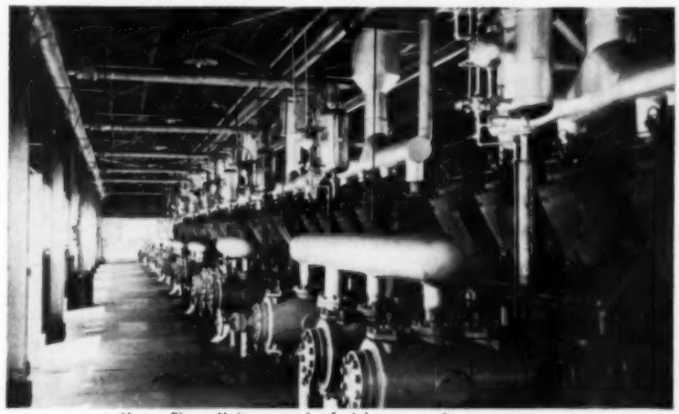
D. M. Salls

David M. Salls, manager of gas industry marketing for The Cooper-Bessemer Corp., has been named product sales manager for the company's RT-248 gas turbine. The revolutionary gas turbine, driven by a modified J-57 jet engine, was developed by Cooper-Bessemer in cooperation with Pratt & Whitney Aircraft Division, United Aircraft Co., East Hartford, Conn. The new unit is scheduled for its first pipeline installation at the Columbia-Gulf Clementsville, Ky., compressor station next summer. Mr. Salls first joined Cooper-Bessemer in 1941. In 1947 he became associated with the Texas Eastern Transmission Corp., and returned to Cooper-Bessemer in 1951.

White Jacksonville Branch

The White Motor Co., truck-manufacturing firm headquartered in Cleveland, has established a new White Truck division branch in Jacksonville with official opening of this new half-million-dollar headquarters. The new "T"-shape branch structure, first of its type built by White, is planned for high-efficiency truck servicing in drive-through bays to service the fast-growing Jacksonville market. The new branch is headquarters for White and Autocar sales, parts, and service.

VAPOR PHASE® PUTS ENGINE HEAT TO WORK, CUTS FUEL AND EQUIPMENT COSTS AT TIDEWATER'S VENTURA PLANT



Vapor Phase Units on each of eight gas engine compressors.

BEFORE VAPOR PHASE®

Power at the VLW Lease Gas Compressor Station consisted of eight Gas Engine Compressors of 2250 BHP total.

Engines were cooled by large radiators **with fans**, driven by separate multiple cylinder gas engines.

Gas-Fired Oil Heaters were used to separate water and sludge from crude oil.

Therefore Tidwater had the cost of additional engines and fuel to cool compressors, plus fuel cost to heat oil.

Crude Oil Treaters operated by 4000# steam per hour recovered by Vapor Phase from engine heat.

AFTER VAPOR PHASE® INSTALLATION

1. Engines are cooled by thermal circulation providing uniform temperature throughout the engine.
2. Separate gas engines to run radiator fans are eliminated.
3. Recovered heat from the engines produced 6750 pounds steam per hour which is fully utilized.
4. Gas-Fired boiler is eliminated.
5. 4,000 pounds of steam per hour heats the crude oil to separate water and sludge from oil.
6. Excess steam is used to heat the workmen's locker room and to drive a steam turbine for the standby condenser-engine cooler.
7. Engine maintenance is reduced.

Excess steam drives turbine for standby condenser.

E C VAPOR PHASE

ENGINEERING CONTROLS, Inc.

AN AFFILIATE OF ST. LOUIS SHIPBUILDING & STEEL CO.

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St. Louis 11, Mo.

1939 N. Hillhurst Ave.
Los Angeles 27, Calif.

String of wells lining site of navigation lock on the Old River keep the excavation site dry. Each of the 37 wells can pump 1000 gpm. Water is piped downstream for discharge.

One of the GM 3-53 diesels which drive the turbine pumps. Engines equipped with Fulton-Sylphon fuel shutoff to guard against damage by low oil pressure, high water temperature.

PUMPS WORK TO CONTROL WATER FLOW

EVERYONE knows something about the mighty Mississippi River. But what many of them don't know is that a far lesser stream in Louisiana called the Atchafalaya poses a serious problem because it has the audacity to steal the only thing the Mississippi has to offer—water. And in the Semmesport, La., area, a gigantic project is underway to restore the balance once again.

The project has many parts—an outflow channel connecting the Mississippi with the Red River; a low sill structure to control the flow through the outflow channel; new levees and levee enlargements and a new west approach channel, which includes a navigation lock, from the Mississippi to the Atchafalaya. There are some strange twists to all this construction. For example, despite the abundance of water in the area, 37 water wells ring the location where the lock will be. These wells are needed to keep water bearing sands flushed out while excavating work is underway. Excavating is next to impossible when the hole keeps filling up with water. The wells are being drilled by Stewart and Stevenson Services, Houston, Tex., under a turnkey subcontract with Brown & Root, Inc., also of Houston. The latter is prime contractor for construction of the $15 million lock seven mi. from the mouth of the Old River.

The 37 wells, each equipped with a Red Head deep well turbine pump powered by a GM 3-53 diesel engine, are being completed at approximately 155 ft. Together they will pump a total of 37,000 gals. a minute. The engines deliver 40 cont. hp and are set for 2150 rpm.

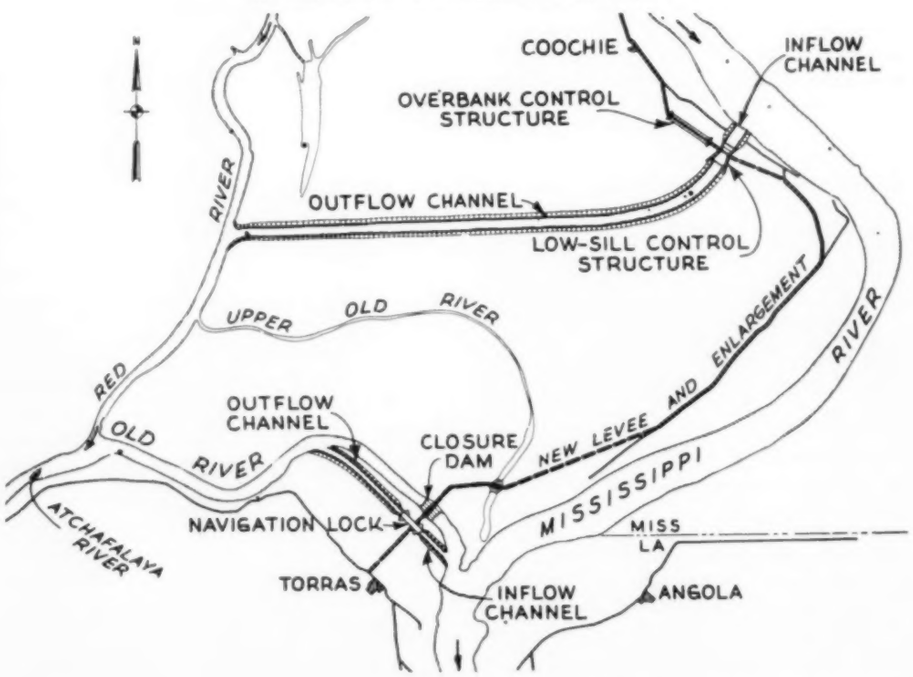
The Old River has been the Atchafalaya's accomplice in the theft of water from the Mississippi. The distance from the junction of the Old and the Mississippi Rivers to the Gulf of Mexico is 313 mi. But it is only 140 mi. to the gulf by way of the Atchafalaya. It is understandable then why water from the Mississippi pours into the Atchafalaya through a willing medium like the Old River. The tendency of the Atchafalaya to dominate the Mississippi has become an acute problem in recent years, threatening existing flood control systems and industrial and domestic water supplies lower on the Mississippi by intrusion of salt water.

Two basic problems were considered to restore proper flow balance: For flood control and navigation on the Atchafalaya there must be a channel connecting the Mississippi and the Atchafalaya; and the Old River must be maintained for navigation purposes. The first problem will be met by an outflow channel connecting the Mississippi and the Red River, which converges with the Old River to form the Atchafalaya (see map). The Atchafalaya channel cannot be closed from the Mississippi and opened only on a "flood" basis. Therefore plans called for a 970 ft. low sill structure 10 mi. above the Old River connected by a channel to the Mississippi and Red Rivers. The Old River channel will be blocked off by an earthen dam but in order to keep the river open to navigation, a 1544 ft. lock will allow vessels to travel between the Atchafalaya or Red Rivers and the Mississippi.

The Stewart and Stevenson wells that will keep the excavation dry were each drilled in an average of 15 hrs. Drilling rigs used feature 6 in. drillstem flanged together with suction through the drillstem to surface. Water is pumped into a common 20 in. pipeline for discharge downstream.

The $80 million control project is being carried out by the Mississippi River Commission, Army Corps of Engineers. The New Orleans District, Corps of Engineers, is in charge of construction.

This map shows locale of Old River Control Project.



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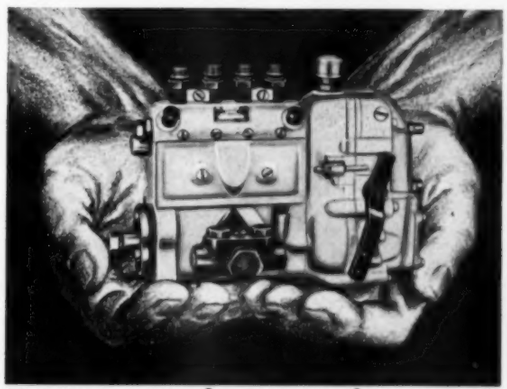

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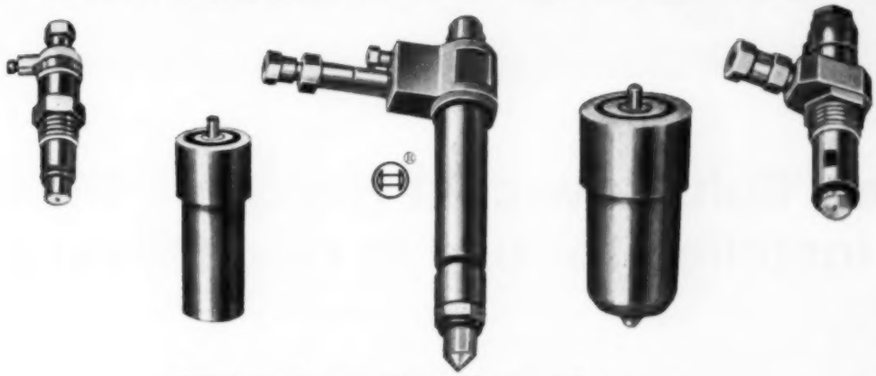

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The most highly regarded name in fuel injection equipment—that's ROBERT BOSCH and here's why: Experience dating back more than 30 years in equipment made to the closest tolerances...perfect performance on millions of engines...quality service the world over... most complete line of nozzles.

ROBERT BOSCH is the fuel injection equipment that made the high speed diesel engine practicable. It is used as *original* equipment by the world's most exacting engine makers, both here and abroad.

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New light, low-cost Hercules Diesel installed for use in city delivery

Motor Cargo, Inc., of Akron, Ohio, is a major carrier operating more than 2,000 vehicles in a network covering the northeastern part of the country.

They are experimenting with the new Hercules truck diesels, using a 20,000-22,000 pound GVW vehicle powered with the lightweight, low-cost—only $1,400 list price—D-298-H engine. This six-cylinder diesel is rated 115 horsepower at 3,000 RPM and weighs only 850 pounds.

Check these advantages — diesel fuel economy, simple installation, low maintenance costs, low original cost—and you have the reasons Motor Cargo made this move.

Hercules is the first U.S. engine maker to design diesel power plants specifically for light and medium-weight trucks. You don't have to pay high-price or high-weight penalties for diesel economy any more. Specify your next truck with a Hercules diesel, available in models from 50 to 175 horsepower.

If you are about to major-overhaul a gasoline-powered vehicle, call your Hercules distributor for the facts on how you can save with Hercules diesels. Or write Hercules Motors Corp., Canton 2, Ohio.

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Canton, Ohio

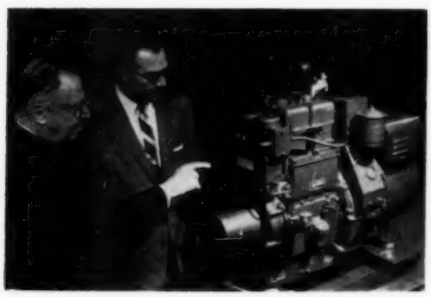
WATCH HERCULES FOR THE "NEW LOOK" IN ENGINES

Heat Exchanger Products Manager

Richard J. Riedl

Appointment of Richard J. Riedl as product manager in charge of the heat exchanger products department has been announced by E. W. Petersen, vice president—marketing for American-Standard Industrial Division, Detroit, Mich. In his new position, Riedl will be responsible for all phases of market planning, evaluation and development for heat exchanger products. Mr. Riedl is a graduate engineer of the University of Michigan. In 1950, he joined the Ross Heat Exchanger Division of American-Standard in Buffalo, N. Y., which became a part of the American-Standard Industrial Division in January of 1959. He was manager of contract engineering at the Buffalo plant before coming to Detroit in his new position.

New Kohler Electric Set



One of the trio of new Kohler diesel electric plants gets a close inspection from E. J. Biever, left, factory manager, and G. A. Desmond, engine and electric plant sales manager, as the unit passes through the company's testing area at Kohler, Wis. This 5000 watt, two cylinder, air-cooled diesel unit is one of three now offered by Kohler Co. for aplications in construction, railroad, marine, and industrial markets. Kohler air-cooled diesel electric plants are available in 2000, 5000, and 7500 watt sizes. The diesel units offer fuel economy, low maintenance upkeep, quick, all-weather starting, interchangeability of all parts except the crank shaft, and a manually operated compression release on push button and manual starting models with a solenoid operated compression release on the remote starting models. (ITS NEW)

580 HP M/V *Myrtle Lee* Enters Sand, Gravel Service

Recently designed and built for the Knoxville Sand & Gravel Co. by St. Louis Shipbuilding & Steel Co., the new twin screw 580 hp towboat *Myrtle Lee* is scheduled to enter sand and gravel service on the Tennessee River. The boat was to be christened by her namesake, Mrs. H. I. Young, wife of the president of American Zinc, Lead and Smelting Co., parent company of Knoxville Sand & Gravel Co.

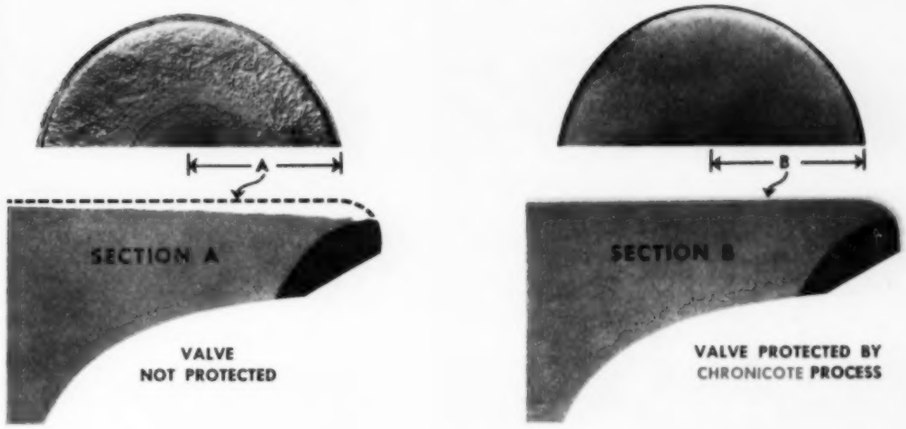
The *Myrtle Lee's* hull dimensions are 64 x 20 x 7 ft. with a normal draft of 4 ft. 6 in. The hull is

framed transversely and longitudinally with hull lines developed for best possible integration of Kort nozzles and tunnels. Propulsion power is furnished by two turbocharged 290 hp Caterpillar model D353 diesel engines with Twin Disc reverse-reduction gears turning 4 blade, 56 in. diameter propellers. Goodrich rubber bearings are used in the stern struts. The engines are pilot-house controlled with Morse Co. mechanical single lever units. A 10 kw GM Diesel generator set provides electric power. Panels are provided for 110 volt ac power distribution.

Clear jacket water for the propulsion and generator engines is circulated through a closed-type skin cooling system. Hydraulic type steering systems are provided for the backing and steering rudders with mechanical follow-up controls. A 14 cfm, 3 hp motor driven air compressor is provided for main engine starting.

CHRŌNICŌTE

A New Low-Cost Corrosion-Resistant Valve Head Coating that Eliminates Deposit-induced Preignition



CHRŌNICŌTE is a newly developed Eaton process of applying a chrome-nickel alloy to heavy-duty valve heads. At reasonable cost, it provides a degree of protection against preignition and corrosion heretofore accomplished only by means of much more costly methods.

We will be glad to furnish your engineers with technical reports covering life comparisons between CHRONICOTE and unprotected valves. We believe you will agree that Eaton CHRONICOTE Valves provide the long-sought solution to the problems of rapid corrosion and deposit-induced preignition. Write, wire or phone.

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Torque Converter Folder

Clark Equipment Co.'s new 14, 15 and 16 in. torque converters for heavy duty, off-road vehicles are described in a four-page color folder. In addition to detailed descriptions of optional equipment, such as clutch controls, reduction drive, etc., power curves for each of the three basic models are provided. Input of the three wheel sizes in the new torque converter line vary from 400 lb.-ft. to 775 lb.-ft. with multiplication ratios from 2.5-to-1 to 3.1-to-1. Copies of the folder can be obtained by requesting Bulletin EFS-5 from Clark Equipment Co., Automotive Division, Jackson, Mich.

Honeywell Appoints Ridley

Douglas K. Ridley has been appointed by Minneapolis-Honeywell Regulator Co. to a new post as contract sales manager for automatic control equipment produced by its Philadelphia-based Brown Instruments Division and other industrial products group units. He will be responsible for contract operations embracing installation and servicing of industrial instrumentation systems designed and developed by Honeywell. Mr. Ridley joined Honeywell's Commercial Division in 1947. He served as regional sales manager in Dallas and Chicago prior to his present assignment.

Fuller Transmission Topics

Featured in Fuller Manufacturing Co.'s magazine, *Transmission Topics*, is a mammoth, 1,200 mi. highway construction job presently under way in Brazil. Also included in the current issue are a salute to the Boy Scouts of America, a schedule of motor fleet supervisor training classes and an excerpt from an International Harvester analysis of engine failures. A copy of *Transmission Topics* may be obtained from Fuller Manufacturing Co., Transmission Division, Kalamazoo, Mich.

SIMPLICITY
in the Heart of the
Modern Diesel Engine
Simple—Only 8" long, 3¼" wide, 5½" high . . . weighs less than 10 pounds . . . fewer parts to service, fewer adjustments to make.
Versatile—Because of accessories that can be built in or added at low cost taking up no, or very little, valuable engine block space.
Economical—Initial cost is less, costs less to service, saves money because of its dependable service.
HMS
makes good diesels better
ROOSA MASTER
Write for Guides to better fuel injection. One features the pump, the other an efficient, economical filter.
HARTFORD MACHINE SCREW CO., HARTFORD 2, CONN.
Division of Standard Screw Company

3 Receive Promotions at Electro-Motive Division

Promotion of three men in the Electro-Motive division of General Motors was announced recently by the division. Promotion of Max Ephraim, Jr., from locomotive section engineer to assistant chief engineer in charge of the electrical, mechanical and locomotive design groups, was announced by T. B. Dilworth, chief engineer of the Electro-Motive Division. Succeeding Mr. Ephraim as locomotive section engineer is H. L. Smith, Jr. Mr. Ephraim was born in Chicago and is a graduate of Harper High School and Armour Institute (now Illinois Institute of Technology), where he received a degree in mechanical engineering. He was hired as a junior mechanical engineer at Electro-Motive June 12, 1939. On March 1, 1941, he was appointed sales engineering coordinator. From October, 1943 until March, 1946, he was on military leave, serving as a Lieutenant, j.g., in the U.S. Navy. Mr. Ephraim returned to Electro-Motive as a project engineer on March 13, 1946, and was promoted to senior project engineer on January 1, 1949. He became equipment engineer February 1, 1950, and on June 1, 1955, was promoted to locomotive section engineer.

Harold L. Smith is a native of Muskogee, Okla., and was graduated from the University of Michigan with a mechanical engineering degree. He was hired as a detail project engineer at Electro-Motive June 24, 1946, and on January 1, 1948 was promoted to a project engineer. Another promotion to senior project engineer came in March, 1951. On March 1, 1953, Smith was transferred to central office in Detroit, on special assignment to R. K. Evans, executive vice president in charge of the engine group. Transferring back to Electro-Motive on January 1, 1955, he was appointed Truck Engineer. On November 1, 1958, he was promoted to carbody, truck and export engineer.

Promotion of Mark D. Disosway from senior sales engineer to assistant export sales manager was announced by Victor E. Rennix, general sales manager of Electro-Motive Division of General Motors. Mr. Disosway was graduated from the University of Illinois with a degree in electrical engineering. He started his Electro-Motive career in April, 1938, as a junior electrical test man. In November, 1939, he was promoted to service instructor in the service department. On military leave from June, 1944 to August, 1946, he served as an ensign in the U.S. Naval Reserve. On returning in 1946 Disosway was assigned as a technical engineer in the service department. On December 1, 1947, he was promoted to assistant manager of the technical section. In April, 1948, he transferred to the sales engineering section as a sales engineer and on January 1, 1950, was made manager of that section. He took over new responsibilities as assistant to the export manager in the export sales section in April 1954. From this position he was promoted to his new post as assistant export sales manager.

Worthington Servicemen Plan Compressor Station Visits

Seven service experts from Worthington Corp. are beginning their second round of visits this year to every Worthington gas engine compressor installation in the pipe line industries. The new customer service, dubbed the "missionary program", was kicked off early this year when the seven top service engineers from Worthington's engine and compressor division in Buffalo, New York, were assigned territories. Under the program every Worthington pipe line compressor installation will be visited at least once. Al Busch, who heads up the group of travellers, stated, "We, like our competitors, have visited our engine compressor installations in these fields for many years, but this is the first time anyone has attempted to set the calls up on a regular basis."

"Each of the seven men will check each installation in their territory at least every six months. There are more than 150 of these job sites, and the Buffalo-headquartered men will be kept busy," Busch said.

Ed Murray, Manager of Sales & Service, added that "The purpose of these visits is to assist the operators of these units in every way possible. We have found that not only are these calls beneficial to the customer, but Worthington gains a great deal also by: closer contact with field problems, putting out small service fires before they become raging blazes, and by noticing ways we can improve our equipment."

A-C District Appointments

Appointments to its north central and southwest regions have been announced by the Allis-Chalmers Co., Industries Group. North central appointments include Warren D. Chinn, sales representative, Minneapolis district; Donald H. Kuenning, sales representative, Milwaukee district and Donald B. Cutler, regional serviceman. Southwest region assignments include Warren W. Chapman, Shreveport district; T. J. Curlee, Jr., Beaumont district and Duane L. Miller, Amarillo district. Also announced were appointment of James Barrett as sales representative to the El Paso district and Edwin C. Neuman as sales representative in the York district.

Thruway Tandem Conference

The New York State Thruway was host to representatives of four other superhighways January 12 at a conference on tandem trailer operations. The meeting was called to work toward more uniform tandem regulations and reciprocity among the turnpikes. Qualifications of drivers and pieces of equipment were reviewed. It was pointed out that individual qualifications in all areas by each turnpike would be a burden on carriers and perhaps prohibitive for them. Tandem rules of New York and Massachusetts were described as identical. Ohio's and Indiana's were nearly the same, except that they do not require trailer certification. Kansas' rules varied considerably, requiring no prequalification of personnel or equipment beyond compliance with the regulations of the ICC and Kansas agencies having jurisdiction. The group discussed the possibility that the Pennsylvania Turnpike Commission might enter tandem operations. It was agreed that Pennsylvania should be invited to future meetings to discuss reciprocity, in the event it should authorize tandems. The representatives agreed that a block numbering system should be established—so that carriers need not number vehicles differently for each turnpike. Under the plan, the facility first issuing a permit to a carrier would issue a "TT" number in the appropriate series.

Henchel-Werke to Market Locomotives in U.S.

A line of explosion-proof diesel hydraulic locomotives will be offered on the American market, it was announced by Henschel-Werke G.m.b.H. of Kassel, West Germany, and its American representative, Norca Machinery Corp., New York City. The locomotives are designed for use inside oil refineries, chemical plants producing explosive liquids such as rocket fuels, and in mining operations. Features designed to insure safety against explosion include the regulation of the exhaust gas temperature by means of water injection into the exhaust pipe and a thermostatically controlled shut-down valve that operates when exhaust temperature exceeds 320° F. The engines also have a valve that shuts down when the engine speed is reduced below a pre-set minimum. This valve protects the engine in case an explosive mixture is drawn into the air-intake. Electrical equipment on the Henschel diesel hydraulic locomotives is equally well guarded. Electric lines are two-pole and laid in steel pipes. Generator, starter, lights, fuses and voltage regulators are resistant to pressure. Batteries are explosion proof. Henschel-Werke, which recently delivered its 30,000th locomotive, makes the engines, which produce up to 500 hp, for these locomotives in naturally aspirated or supercharged models with 6 and 12 in-line cylinders. The smaller locomotives, up to 170 hp, are equipped with hydraulic-mechanical transmissions originally designed for trucks. Larger units, producing up to 850 hp, contain transmissions composed of a hydraulic torque converter and two hydraulic couplings or of other combinations which are automatically engaged depending on engine speed and tractive power required.

New 103 Eimco Dozer

The Tractor Loader Division of the Eimco Corp. of Salt Lake City, Utah, has announced that it is now offering GM Diesel's 4-53 engine in its new "103" crawler-tractor. According to Eimco the "103" has a maximum drawbar pull of 33,000 pounds with zero track slippage. The "103" is equipped with independent track control with individual full reversal on each, constantly running power take-off drive, and an independent hydraulic pump drive that allows simultaneous use of hydraulic, winch and hoist accessories. (ITS NEW)

FOUR OF THE WORLD'S BEST OIL RINGS!

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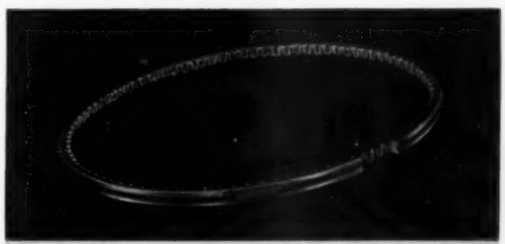
Each is a Pedrick FORMFLEX design, with the exclusive "Equalizer", an abutment-type expander which exerts a uniform controlled pressure. The ring sections are radially thinner and more flexible, and thus are more conformable than any other rings! Scuffing is eliminated, oil control is improved, wear is reduced, power is preserved, and efficient operation is assured for more engine hours.

DO8—Because there are *two* radially-thinner cast-iron sections which move independently of each other, this ring achieves *maximum* conformability and drainage. Each cast-iron piece has directional bevel and an undercut edge as well as drainage slots underneath. Unequalled in performance.

DD8—Provides maximum radial conformability and drainage under both scraping edges. Is somewhat lower in cost than the DO8 because of one-piece instead of two-piece construction of cast-iron section.



HO8—Maximum conformability and adequate drainage, with continuous channel, two scraping edges and wide central drainage slots for effective oil control. First cost is less than either DO8 or DD8.

BS8—This conformable ring combines compression and oil control functions. Backed by the "Equalizer," the solid single-piece cast-iron section has a narrow scraping edge and is especially effective in controlling blow-down and oil consumption in 2-cycle engines.

Our engineers will be glad to discuss with you, the proper application of Pedrick's FORMFLEX oil rings. Phone, wire or write to Wilkening Manufacturing Co., Philadelphia 42, Pa. Saratoga 9-3770. In Canada: Wilkening Manufacturing Co. (Canada) Ltd., Toronto 2.

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Inland River Reports

By **A. D. Burroughs**

TWO new towboats, rated in the 6,000 hp class, are slated for construction at Jeffersonville Boat and Machine Co., Jeffersonville, Ind. Still in the initial planning stages, the vessels are expected to cost approximately $3,500,000, and will see service in the American Commercial Barge Line fleet.

A July delivery is scheduled for the newest towboat power-king, a 184 x 54 ft. craft under construction at St. Louis Ship. The $2,000,000 vessel will have a rated 9,000 hp from four model LS8 engines supplied by Cooper-Bessemer Corp.

BOO CENAC, a December delivery from Main Iron Works, Houma, La., is giving fine performance for the E. A. Cenac Towing Co., La. The 48 x 15½ ft. craft has a rated 350 hp supplied from two GM engines.

A Single-screw craft, also completed by Main Iron Works for Cenac Towing Co., is in action. The 48 x 15½ ft. vessel carries a Cummins engine for the rated 275 hp.

MARIETTA Manufacturing Co., Point Pleasant, W. Va., completed the newest harbor towboat for Point Towing Co., Point Pleasant, W. Va. The unnamed craft receives a total 420 hp from a twin pair of GM engines.

A Fairbanks-Morse Model 38D8⅛ engine, rated at 2000 hp at 850 rpm will equip each of the four Navy tugs now under construction at Southern Shipbuilding Corp., Slidell, La. These commercial-type VTB tugs measure 135 x 29 ft.

TWO GM model 12V71 engines, provide the rated 750 hp for the new towboat, *Point Landing VI*. The 70 x 24 ft. craft was delivered in January by Main Iron Works, Houma, to Point Landing Inc., New Orleans.

TWO Caterpillar engines supply the rated 600 hp for the new harbor boat, *Blair Wilson*. Completed by Nashville Bridge Co. for Mid-South Towing Co., Tampa, Fla., the vessel was making excellent time when spotted downbound for service on the lower Mississippi River.

A new 64½ x 22 ft. craft, delivered in early '60 by Main Iron Works, is gaining favorable reports, with push performance provided by Cummins engines, for a rated 600 hp. The vessel was delivered to the New Orleans branch of Cummins Engine Co.

A new Cummins VT-12M engine has been installed on the tug, *Chief*. The 55 x 17 ft. craft, owned by W. R. Harrison and Sheldon and Wally DeHart, performs in the Abbeville, La., area.

SCHEDULED for February performance from Main Iron Works is the new 65 x 20 ft. twin-screw craft, built for owner Charles Garber Towing Co., Morgan City, La. Twin GM 6-110's supply the rated 600 hp.

A 400 hp GM (Cleveland) engine will be placed on the U.S. Coast Guard vessel *Goldenrod*. The diesel cutter was completed by Dubuque Boat and Boiler Works in 1938 with re-engining in 1944.

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CFC Filters include a wide range of models for lube oil and fuel filtration.

There are many types for both depth and surface full-flow filtration; by-pass; and shunt systems.

Experienced CFC Engineers will analyze your individual requirements and recommend the exact filter for your application.

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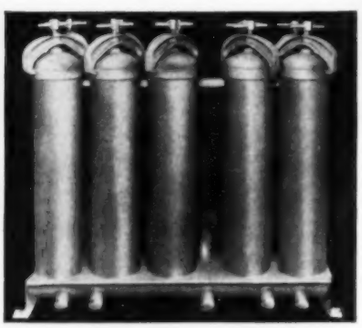
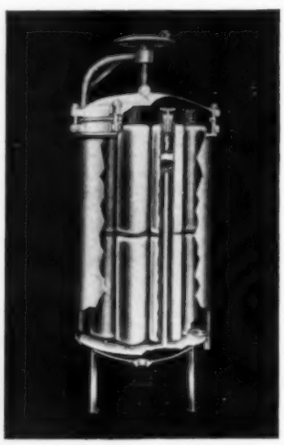
CFC Fulflo Filter: Single-tube filter, with patented Honeycomb Filter Tubes, for true *depth* filtration. Multi-tube models also available.



CFC Michiana Filters: Variety of models available for 150 hp engines to 3,300 hp. Designed to fit limited space.



CFC Honan-Crane Multi-Cartridge Filter: Choice of seven types of filter cartridges includes inert media for removal of solid contaminants or Cranite (Fuller's Earth) for removal of solid particles and all products of oxidation.

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PLANTS IN MELROSE, MASSACHUSETTS AND LEBANON, INDIANA

Crewboats Set Distance Record

Two 45 ft. twin screw steel personnel launches recently completed a 2000 mile ocean voyage from New Orleans to Maracaibo, Venezuela. It is believed the trip set a long distance record for boats of this type and size. The boats, named *Semarca 22* and *Semarca 23* were built along identical lines. They were sold by the George Engine Company, GM diesel distributor of Harvey, La., to Tidewater Marine Service, C.A. for service on Lake Maracaibo. Before the precedent setting voyage, crew boats for use in foreign area were always delivered in deck cradles aboard ocean going vessels. Mr. H. F. Colby, executive vice-president and general manager of George Engine, conceived the idea of the record trip to prove the reliability, seaworthiness and durability of the boats and their symetrically matched pairs of standard series 71 GM diesel engines. The boats were designed and built by Sewart Seacraft, Inc., of Berwick, La. This shipyard has launched more than 1,000 crew boats since 1946, practically all of them powered by GM diesels. Frames and plating are of welded steel, with cabins and wheelhouses aluminum to reduce topside weight. In normal service on Lake Maracaibo, where they are used to transport workers to and from oil drilling sites, the boats carry 16 passengers and a crew of two. Fuel capacity is 250 gals. For the long ocean voyage, they were fitted with extra tanks to increase fuel capacity to 1,100 gals., extra life rafts and emergency signalling devices. Everything else aboard was standard "off-the shelf" equipment, including the matched pair of GM diesel 6-71 marine engines. The trip was originally expected to take 8 to 10 days, with the boats scheduled to refuel in Cuba and the Dominican Republic. Due to weather encountered, the voyage actually took two weeks. After a fast crossing of the Gulf of Mexico the two *Semarcas* unexpectedly ran head on into Beulah, the second tropical storm of the 1959 season. For several hours, they were buffeted about in waves which at times reached 50 feet in height. When the storm showed no signs of abating, the *Semarca* skippers decided to return to Cuba, seeking the lee of Cabo Cajon, an anchorage on the Cuban north coast. The trip from Cabo Cajon around Cape San Antonio was made in 25 to 35 ft. seas with winds estimated at 40 knots. Eventually, the boats reached the comparatively calm waters of the Bay of Batabano on Cuba's south coast. They made port at Nueva Gerona on the Isle of Pines, where they were refueled after the crews went ashore for two days of rest. The wind was still blowing 30 knots with no sign of lessening when the boats headed southeast across the open Caribbean for South America. Seas averaged 20 to 30 ft. throughout this final leg, forcing the boats to be throttled back from their normal cruising speed of 24 knots to less than four knots. On several occasions violence of the seas turned the compass in the automatic piloting devices completely over in their gimbals so that "south" became "north" and vice versa.

Assistant District Manager

John E. Smet, of Elliott Co.'s New York office, has been appointed assistant district manager. An electrical engineering graduate of the University of New Hampshire, he has also studied at Harvard and MIT. Since 1946, Smet has spent twelve years with one of the nation's largest industrial manufacturers.

Diesel and Gas Engine Progress Moves Executive Offices

The executive offices of DIESEL AND GAS ENGINE PROGRESS have been moved to 9110 Sunset Blvd., Los Angeles, Calif. The editorial and production offices of the magazine remain at 1701 W. Wisconsin Ave., Milwaukee, Wis.

The Los Angeles office will continue to handle all advertising and editorial material relating to the DIESEL AND GAS ENGINE CATALOG. Material for the monthly magazine will be processed through the Milwaukee office.

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FROM
AMOT

MODEL 2900
VIBRATION
VALVE

Offered as an accessory to the widely accepted 1476 series of Safety and Automatic Controls, the Model 2900 Vibration Valve detects and trips on excessive vibration of reciprocating or rotating machinery such as engines, compressors, motors, fans, pumps, etc.

FEATURES:

DUTY	For Pneumatic or Hydraulic Control Systems to 80 psi.
OPERATION	Three-way, snap acting, non-overlap valve action.
RANGE	Adjustable to amplitudes between .008" and .050" at 250 cpm and between .003" and .023" at 700 cpm or higher.
RESET	Built-in piston to reset control with 40-80 psi air; also provides means for time delay on start-up.

WRITE FOR BULLETIN 493

AMOT CONTROLS CORPORATION

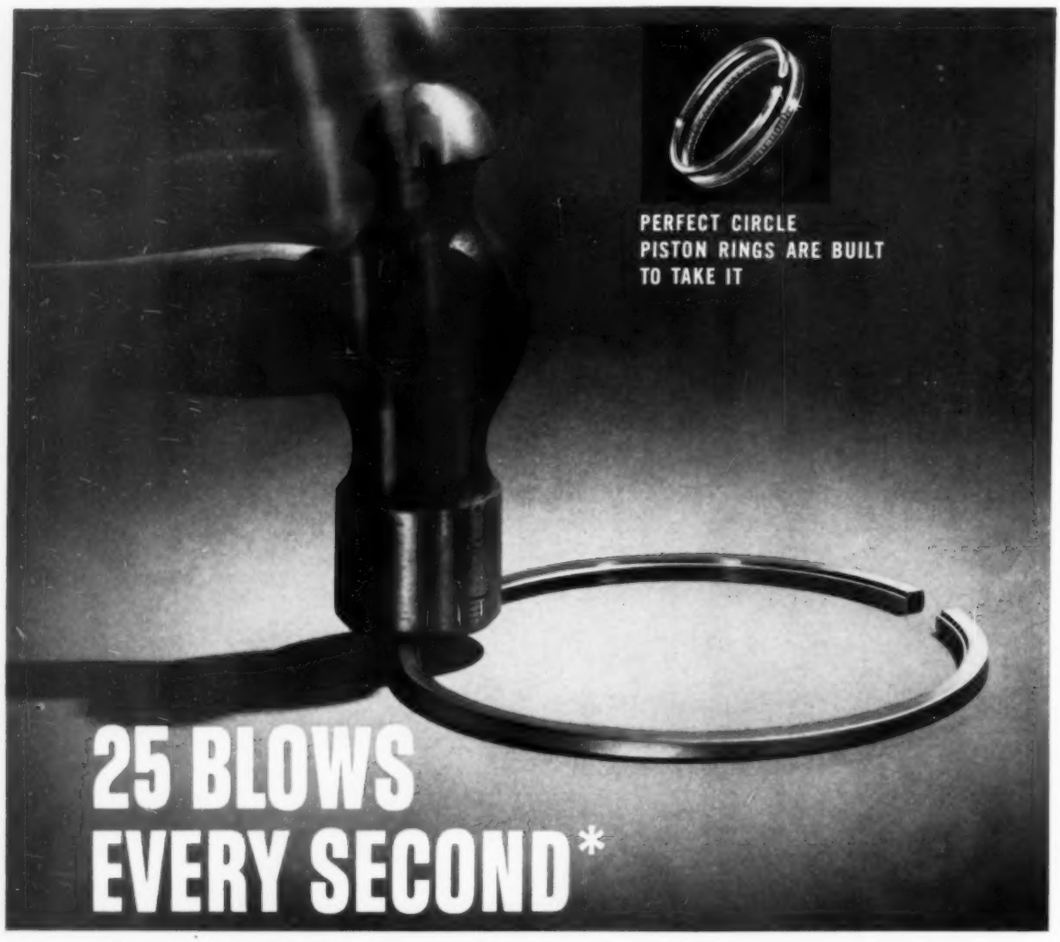
OFFICES IN PRINCIPAL CITIES **RICHMOND, CALIFORNIA**

120 Truck Order

Chemical Express of Dallas, Tex., has ordered 120 Kenworth model 922 conventional highway trucks, equipped with Kenworth's exclusive tilting "Unitglas" front end. The new trucks will be used to haul bulk cement on widespread routes throughout Texas. Powered by a Cummins NH-220 engine, each truck will be equipped with a Fuller R-96 RoadRanger transmission, Timken R-200 drive axle and a Timken TK-560 trailing axle. Wheel base of the units is 182 in., and fuel tank capacity is 145 gal. The order, represents the largest single purchase of conventional model highway trucks ever received by Kenworth Motor Truck Co. First 75 units are scheduled for delivery by March.

Cooper-Bessemer Bulletin on 300 HP Compressor

A new 6 page bulletin on the Cooper-Bessemer DM-125 packaged compressor (300 hp class) is available from The Cooper-Bessemer Corp., Mount Vernon, O. Bulletin 92 reviews the need for small horsepower, heavy-duty integral engine-driven compressors specifically designed for field gathering service. Power unit and compressor cylinders used in the packaged construction of the DM-125 are discussed, along with operating characteristics. Articulated connecting rod construction and crosshead and guide assembly are illustrated, as well as overall dimensions. Units are manufactured by The Cooper-Bessemer Corp., and skidded, prepiped and given a closed water system by C-B Southern, Inc., Houston, Texas. For Bulletin "92" write The Cooper-Bessemer Corporation, Mount Vernon, O. (ITS NEW)



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You can't see the hammer-like blows piston rings receive, but costly results are soon evident when inferior material is used.

Correct metallurgy is one of the most important features of every Perfect Circle piston ring. Over six different metals are used at Perfect Circle... each material the highest strength compatible with the specific application... each material selected for utmost protection against breakage.

Correct, proven metallurgy is another reason why Perfect Circles are preferred and installed with confidence by leading engine manufacturers and mechanics everywhere.

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PISTON RINGS · PRECISION CASTINGS
POWER SERVICE PRODUCTS · SPEEDOSTAT

HAGERSTOWN, INDIANA · DON MILLS, ONTARIO, CANADA

Turbine Starter on "Hound Dog"

Hound Dog, the air to ground missile carried by the B-52, is started by a specially designed air turbine probe starter developed by The Garrett Corp. AiResearch Phoenix division. Produced by the missile division of North American Aviation, the Hound Dog is carried in pairs under the wing of the B-52 within several hundred miles of the target area where it becomes self-propelled by its own J-52 engine and is directed to the target by its navigation system. Although the J-52 engine can be fired-up while the missile is airborne, it is started on the ground by the AiResearch starter in order to operate as a booster engine for the B-52 during taxi and takeoff. Its added thrust more than makes up for its resultant weight and drag. Weighing 29 lbs., the AiResearch probe starter is clamped to the Hound Dog's starting pad located on the bottom of the missile. Activated by a push button in the B-52's cockpit, the starter turns over the J-52 engine with air supplied by a ground compressor unit in approximately 25 seconds. After starting the probe is removed.

S & W Adds Internationals

S & W Motor Lines, Inc., a Greensboro, N.C., irregular common carrier operating principally between the two Carolinas and Ohio and along the Atlantic seaboard, has recently placed in service 14 International model DCO-405 tractors as part of a fleet modernization program. According to G. H. Sharp, S & W president, they are being used with 40 ft. semi-trailers to haul 30,000 lb. payloads. The 134 in. wheelbase trucks are equipped with sleeper cabs, Cummins NH-180 diesel engines and ten-speed RoadRanger transmissions. Each is traveling at the rate of 100,000 miles per year, Sharp said. S & W employs 185 pieces of equipment to haul textiles, furniture, tobacco products, stone and pre-stressed concrete building materials. In 1958, the 29-year-old firm grossed $1.25 million while its fleet traveled more than six million miles.

Robert Bosch Announces Organizational Changes

Robert Bosch Corp., has announced two organizational changes. Harry W. Drescher, who has been secretary and technical manager of Robert Bosch (Canada) Ltd., has been named a vice-president and will head the firm's engineering division. William J. Finnell, former departmental sales manager, has been appointed manager of the manufacturers sales division.

Division Product Manager

Jack Stewig has been named product manager of the CFR Division of the Waukesha Motor Co. The CFR Division manufactures laboratory type engines for the octane rating of gasoline fuels and the cetane rating of diesel fuels. Mr. Stewig joined the Company in 1929 as a member of the service department. In 1937 he was placed in charge of the parts sales of the CFR engine and later directed all domestic sales of the CFR engines.

Webber Appointed

Appointment of Robert D. Webber to Detroit Diesel's service section staff as service engineer has been announced by Chester B. Clum, general service manager for the division. Mr. Webber will be assigned to the Division's Western region at Denver, Colo. Webber, formerly an instructor in Detroit Diesel's Product Service School, has been with GM since 1956.

Pruett To Tulsa Office

Dressler M. Pruett has been transferred to The Cooper-Bessemer Corp. Tulsa, Oklahoma district office as a sales engineer, it is announced by A. W. Abel, Mid-Continent District Manager for the company. In his new post, Pruett will work under the immediate supervision of Abel, on the application and sales of Cooper-Bessemer compressors and engines in that area. Since 1957, Mr. Pruett has been assigned to the sales department at the company's headquarters in Mount Vernon, Ohio.

Bendix Sales Engineer

Appointment of Albert N. Beswick as sales engineer in the middle Atlantic states for Bendix Filter Division, Bendix Aviation Corporation, Madison Heights, Mich. was announced by M. J. Kennedy, general manager of the division. Beswick opens a new office at Ten Banta Place, Hackensack, N. J. to service users in New York, New Jersey, Pennsylvania, Maryland, West Virginia, Delaware, North Carolina and South Carolina. Mr. Beswick's previous associations include Hartwell Aviation Supply Co. of Los Angeles and Curtiss-Wright Corp. He will handle all Bendix Filter Division products.

Sales Training Director

Mr. R. W. Lewis has been appointed director of sales training for Fairbanks, Morse & Co., it has been announced by V. H. Peterson, vice president, sales. His assignment will include developing, in cooperation with the operating divisions, a formal program of sales recruitment, and product and sales training, as well as administering the formal approved programs. Mr. Lewis, a graduate of Macalister College, St. Paul, Minn., joined the St. Paul branch of Fairbanks, Morse & Co. as a dial scale specialist in 1926.

NEW AND NOW AVAILABLE! The completely new 1959 edition of the **DIESEL ENGINE CATALOG**, Volume 24 can now be purchased. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, the Catalog is essential to you. This giant, 400 page, 10½" x 13½", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs $10 postpaid anywhere in the world. Send checks or company orders to **DIESEL ENGINE CATALOG**, 9110 Sunset Blvd., Los Angeles 46, Calif.

Diesel Protection Assured with the *Alnor* Pyrotac®

A continuous check on the operating efficiency of each cylinder in a diesel engine is indicated on the Alnor Pyrotac.

Improper injection, blow by, stuck rings, failure of cooling, overload, or other malfunctioning of the engine is immediately registered by the individual exhaust thermocouples and is indicated on the dial of the Pyrotac. When the instrument is set for the normal exhaust temperature range, any variation up or down shows up immediately on the Pyrotac dial and an alarm signal informs the operator.

The motor driven switch unit of the Pyrotac monitors the exhaust temperatures of each cylinder continuously, thus any trouble in an individual cylinder can be spotted immediately.

Alnor Pyrotac models are available up to 20 circuits. Manually operated pyrometric indicators are sufficient in some installations.

Most diesel power plants operating today are Alnor equipped. Write for bulletin 4703.

Alnor INSTRUMENTS

ILLINOIS TESTING LABORATORIES, *Inc.*
Room 508 • 420 North LaSalle Street • Chicago 10, Illinois

Air-Maze Names Engineers

George E. Slater, has been named assistant chief engineer, liquid filters, and Harold R. Sobeck has been named assistant chief engineer, air filters and associated product lines. Air-Maze Corp., Cleveland, O. Mr. Slater has been with Air-Maze for 14 years, most recently as a senior project engineer. Mr. Sobeck has been with Air-Maze for 10 years, most recently as a senior design engineer.

Boyle Joins General Metals

Wm. F. Boyle has joined the corporate staff of General Metals Corporation, Transamerica's industrial subsidiary. Mr. Boyle was formerly vice president and general manager of the Hamilton, Ohio and Pelton divisions of Baldwin-Lima-Hamilton. He will be on special assignments in General Metals' Enterprise and Foundry divisions in the Bay Area.

Lipe-Rollway Expands DPB Clutch Line

Lipe-Rollway Corp., Syracuse, N.Y., has expanded its DPB Clutch line to include a complete range of direct pressure heavy duty clutches for truck, tractor, bus and industrial use. Designed for on and off-highway equipment, the new models include: 12, 13, 14, and 15 in., either in single or two plate construction. Torque capacity of the new line runs from 200 to a high of 1400 ft. lbs. All Lipe DPB Clutches are available as original equipment, or for interchange sales to Lipe Heavy Duty Clutches under the expanded core credit program. For additional information on the entire Lipe DPB Clutch Line write: Lipe-Rollway Corp., Clutch Division, 806 Emerson Ave., Syracuse 1, N. Y.

Tug Contract Awarded

Gladding-Hearn Shipbuilding Corp., Somerset, Mass., has been awarded a contract for design and construction of a heavy duty tug boat by North Atlantic Dredging Co., Boston, Mass. Measuring 43 ft. 3 in. overall, the boat will be powered by a GM 6-110 diesel engine and will be used for dredge tending duties along the northeast coast.

Turbine Generators Purchased For Army Missile Complex

Another step in the evolution of the gas turbine engine as a reliable, efficient power source was evident this week with the purchase by Sperry-Salt Lake of a number of small gas turbine generators. In support of the U. S. Army Sergaent missile complex the gas turbine generators are manufactured by The Garrett Corporation's AiResearch Phoenix division. Field tests of the gas turbines established extreme reliability under all environmental conditions including desert dust and heat, salt spray and arctic cold. Other features were low fuel consumption, low noise level and growth potential. A turbine unit will power the launchers electrical and hydraulic systems and another unit will supply power to the electronic checkout van. The generators will supply 400 cycle power. AiResearch Phoenix is one of the world's largest producers of small gas turbine engines. Developing its first small jet engine in 1946, the Arizona firm now has close to 9000 units operating in the field in various configurations as compressor or generator units for aircraft ground support, airborne auxiliary power or helicopter propulsion engines.

General Mills Acquires Magnaflux Corporation

President C. H. Bell of General Mills, Inc., announced that the company has acquired the business and assets of Magnaflux Corp. of Chicago, Ill., pioneer in the development of techniques and equipment for detecting hidden flaws in industrial materials. Magnaflux Corp., leader in non-destructive testing, will continue in business at its present location in Chicago under the same name as a wholly-owned subsidiary of General Mills. Formed in 1929, the Magnaflux Corp. offers non-destructive testing systems based on advanced magnetic, ultrasonic, electronic and fluorescent applications in addition to stress analysis and field inspection services. Major users of the equipment include the aircraft, missile, automobile, steel, petroleum and heavy equipment industries. F. B. Doane will retire as Magnaflux president and chairman of the board, but will continue to serve the company as a consultant. Key officers and personnel of the Chicago company will be retained in their present positions, Bell said. "This is a highly specialized company with strong management and more than 400 well-qualified employees," he added. "General Mills' plans call for expansion of the Magnaflux line." A wide range of testing equipment makes up the Magnaflux line. It includes standard units and custom-designed equipment to test parts ranging from minute ball bearings to huge bridges. Company services include sales of equipment to industry, commercial inspection of parts at 16 Magnaflux commercial inspection plants in major cities across the country, or on-location inspection by means of mobile equipment. The firm markets its products throughout the free world. Magnaflux testing is also used in the regular inspection of aircraft, trucks, diesel locomotives and plant lifting equipment, pointing out invisible metal fatigue before danger or breakdown can occur. R. A. Wilson, General Mills vice president and general manager of its Mechanical Division, will be the new president of Magnaflux Corporation. W. C. Babcock, of General Mills' Legal Department, will be secretary.

Sales Engineering Director

D. Brian Wheeler has been appointed director of sales engineering for White Truck Division of The White Motor Co., it was announced by H. D. Weller, vice president-sales. Wheeler replaces William L. Peterson, new manager of the White truck sales, parts and service branch in Philadelphia. A graduate of Case Institute of Technology, from which he received a master's degree in mechanical engineering.

Clayton

DYNAMOMETERS INSURE PEAK PERFORMANCE OF RYDER TRUCK RENTAL UNITS

Clayton Chassis Dynamometer installation at 5-acre "model shop" operated in Miami, Florida, by Ryder Truck Rental for maintenance of 1100 vehicles in Miami District. The plant is a prototype for proposed Ryder shops in other cities.

RYDER LEASED TRUCKS "WEIGH-IN" REGULARLY TO CHECK PERFORMANCE

More than 17,000 truck units operated in over half the fifty states of the nation by Ryder Truck Rental, are tested periodically on the Clayton Dynamometer. This determines if each unit is operating at peak performance under all conditions.

Ryder also uses the Clayton Dynamometer to 'run in' overhauled units under accurately simulated road driving conditions before being returned to service. After-service checks prove service workmanship; allow fine tuning to desired power ranges for maximum efficiency.

After periodic engine overhauls, all Ryder Truck Rental units are subjected to rigid indoor road tests on the Clayton Chassis Dynamometer to run in engine under actual power load conditions before being restored to road service.

Clayton CHASSIS & ENGINE DYNAMOMETERS

CLAYTON MANUFACTURING COMPANY
443 N. Temple City Blvd., El Monte, California

307

New Jet-Powered Gas Turbine Compressor Station Plans Approved By F.P.C.

The Federal Power Commission has approved plans of Columbia Gulf Transmission Co. for construction of a new jet-powered compressor station at Clementsville, Ky. Incorporating the new type 10,500 hp gas turbine being developed jointly by Cooper-Bessemer and Pratt & Whitney Aircraft, this station takes a pioneering step in the gas transmission field.

The revolutionary new turbine utilizes a modified J-57 jet aircraft engine as the power generator. The tremendous thrust of this gas-fueled unit is converted into rotating horsepower by a specially designed Cooper-Bessemer turbine, and this drives a Cooper-Bessemer centrifugal compressor. (See DIESEL AND GAS ENGINE PROGRESS, November, 1959.) The new gas turbine is now in advanced experimental tests in the Pratt & Whitney Aircraft laboratory at East Hartford, Conn. Construction of the new Columbia Gulf station will proceed simultaneously with the development work on the gas turbine. It is expected that the facilities will be completed in the summer of 1960.

New Heat Exchanger Catalog

The Young Radiator Co., Racine, Wis. announces release of a new revised shell and tube heat exchanger catalog. This 15 page, two color catalog presents data on copper base alloy, steel and stainless steel fixed tube bundle heat exchangers. It includes single-pass, two-pass and four-pass models for cooling water and oil in fresh or salt water applications as well as specially engineered heat exchangers for heating or cooling liquids and gases.

The catalog lists tables showing pressure ratings and material specifications for steam service heat exchangers. Construction features, model identification and a six-step set of instructions explain the selection of heat exchangers. Request Catalog 1258A. (ITS NEW)

New Ideal Induction Motors

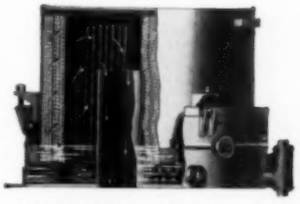
New high-speed squirrel cage induction motors for high speed applications are now being offered in 100-5000 hp., 514-3600 rpm, frames 584-11320 by the Ideal Electric and Manufacturing Co. A one piece, wrap-around steel plate cover running the full length of the frame, extends well below the center-line of the motor on each side to provide natural drip-proof protection and to increase the rigidity of the frame structure. The double end ventilation system provides maximum cooling, permitting full utilization of motor capacity. Rotor and stator assemblies are precision manufactured of select materials and subjected to severe simulated-load tests for peak performance on any installation. Stainless steel retaining rings over rotor end assemblies give additional protection against stresses from centrifugal force where high peripheral speed is encountered. Critical speeds are maintained well above operating range to insure smooth, vibration free operation. Bearing replacement, when inspection proves necessary, can be accomplished without uncoupling the motor, disconnecting leads or disturbing motor or coupling alignment. For further information, write Ideal Electric and Manufacturing Co., Mansfield 17, Ohio. (ITS NEW)

NEW AND NOW AVAILABLE! The completely new 1959 edition of the **DIESEL ENGINE CATALOG,** Volume 24 can now be purchased. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, the Catalog is essential to you. This giant, 400 page, 10½" x 13½", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs $10 postpaid anywhere in the world. Send checks or company orders to **DIESEL ENGINE CATALOG,** 9110 Sunset Blvd., Los Angeles 46, Calif.

A FILTER TYPE FOR EVERY LOCOMOTIVE NEED

Every diesel relies on various liquids and air for its operation. An established supplier to the railroad field, Air-Maze Corporation has an engineered filter to clean the respective liquids and air, thoroughly and efficiently.

For details, write for bulletins or contact your locomotive builder.



Oil Bath Filter—Removes up to 97% of objectionable dirt...has exceptionally high dirt-holding capacity...requires only semi-annual oil changes and annual removal for cleaning.

Engine Air Intake Filters

Panelbath Filter—Removes up to 90% of objectionable dirt. Designed to up-grade panel filtration of intake air, the PANELBATH has low initial cost...replaces 2" and 4" oil-wetted or centrifugal type panels on engine air intakes.

Lube Oil Strainer

For road use and engine break-in. Furnished in a variety of elements, sizes and degrees of filtration for every type of locomotive application.

Oil Bath Filter for Air Compressor Intakes

Designed specifically for use on locomotive air compressors. Air-Maze oil bath filters, because of their simplicity, offer long, efficient service, infrequent maintenance.

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ENGINE AIR FILTERS • CARBODY FILTERS • SPARK ARRESTERS • LUBE OIL STRAINERS • OIL SEPARATORS • PASSENGER CAR FILTERS

Michigan-Ohio News

By Jim Brown

EARLE Equipment Company of Detroit has sold an Allis Chalmers model HD6G diesel tractor shovel with a 1½ yd. bucket to McLouth Steel Corp. of Detroit.

CYRIL J. Burke Inc. of Detroit reports the sale of a Northwest model 6 pull-shovel equipped with a 1¾ yd. bucket and powered by a Murphy model 12 diesel engine. The new Northwest was purchased by Chris Nelson & Son of Royal Oak, Mich. It is working on the 8 Mile Rd interceptor sewer on the west side of Detroit and is one of 27 Northwest units on that job.

PENINSULAR Diesel Inc. of Detroit has sold a model 5023 GM Diesel engine (53 Series) to the Great Lakes Engineering Co. of Detroit. The engine will be used to drive a fire pump in an "unnamed" boat.

WOLVERINE Tractor and Equipment Co. of Detroit and Grand Rapids recently delivered a model H-120 Hough Payloader equipped with a 5 cu. yd. bucket and 300 hp Cummins diesel engine. The new model H-120 is the largest in the Hough line (44,000 lbs.) and is the first one sold in the Michigan area. It will be broken in at a gravel pit owned by Grand Valley Gravel Co. of Grand Rapids, Michigan.

THE Barton Malow Co. of Detroit has accepted delivery on a model 4401 John Deere equipped with a Harlow 21½ ft. lift fork and a GM model 2-53 diesel engine. The unit will be used for materials handling work on building construction projects and was sold by the R. G. Moeller Co. of Detroit.

W. F. Miller Mower & Ford Co. of Detroit reports the sale of a Ford model 330 dieselized unit with Rockford power take-off to John Sewell, a dealer in Utica, Michigan.

WOLVERINE Tractor & Equipment Co. recently delivered an International TD-6 crawler with hydraulic bulldozer blade to Al Thomas of Vicksburg, Michigan.

EARLE Equipment Co. has sold an Allis Chalmers HD11G diesel tractor shovel (with 2¼ yd. bucket) to Better Building Products of Benton Harbor, Mich.

A Pettibone-Mulliken model 240A loader with a 2¼ yd. bucket and model 3-71 GM diesel engine was recently delivered to the Shenk Gravel Co. of Durand, Michigan. This is the second P-M loader purchased by the Shenk Co. during the last year. Sale was made by Cyril J. Burke Co.

PEEL Brothers of Grand Haven, have converted their International model 180 truck from gasoline to diesel with a model 5047 (53 Series) GM diesel engine. Peninsular Diesel supplied the diesel.

FRANK Bedient of Royal Oak, Mich. recently became the owner of a new International TD-9 crawler with hydraulic dozer blade. Sale was made by Wolverine Tractor & Equipment Co.

TOWNSEND & Bottum of Ann Arbor, Mich. has purchased an Austin-Western "Pacer 100" grader equipped with a model 3-71 GM Diesel engine with torque converter. The new grader will be used in the construction of a power plant for Consumers Power Co. of Pidgeon Lake, Mich. Austin-Western distributor is the R. G. Moeller Co. of Detroit.

CYRIL J. Burke Inc. reports the sale of a Pettibone-Mulliken model 440 loader to the Ford Motor Co.'s River Rouge plant. The new loader is equipped with two buckets—4 and 6 yd.—and is powered by a model 4-71 GM diesel engine. It is also equipped with a 2 way radio, heater and 23½ x 25 tires. The new loader will be used in re-handling of iron ore around the open-hearth furnaces and unloading coal, coke and limestone materials from boats.

JOHN Jarosz of Croswell, Mich. has converted his model 7203 Chevrolet truck with a new model 5047 (53 Series) GM Diesel engine. The sale of the engine and installation work was done by Peninsular Diesel Inc.

A McKiernan-Terry model DE-30 diesel pile hammer was recently delivered to the Michigan Limestone Co. of Rogers City, Mich. Michigan Limestone will use the new hammer in breaking limestone boulders (a unique operation requiring a specially adapted head) at their quarry. Sale was made by the R. G. Moeller Co.

BLAKE Gordon of Oak Park, Michigan recently purchased an Allis-Chalmers model HD6E diesel tractor with hydraulic bulldozer blade from the Earle Equipment Co. The new crawler will be broken in on a housing development near Flatrock, Michigan.

AN Oliver model OC-4 diesel crawler tractor with bulldozer blade was recently purchased by the R. L. Coolsaet Co. of Dearborn. The new unit will be used in utility work and pipe laying projects. The new crawler is powered by a three cylinder Hercules diesel engine and was purchased from the Cyril J. Burke Co.

M. L. Chartier of Fair Haven, Michigan has accepted delivery on a new International TD-15 crawler equipped with a winch and 'dozer blade. The crawler will be used around the oil fields near Fair Haven and was purchased from Wolverine Tractor & Equipment Co.

A Caterpillar generator set composed of a Cat D311 diesel engine and an EM generator was recently delivered to Sinai Hospital of Detroit for use as a standby generator unit. Sale and installation was made by Michigan Tractor & Machinery Co. of Detroit.

W. F. Miller Mower & Ford Co. reports the sale of a 106 hp model 330 Ford diesel engine (6-cylinder) to E. & L. Transit Co. of Dearborn, Mich. E. & L. Transit will use the new diesel for installation in one of their Ford F-700 tractors.

New Oil Cooler Catalog From Young Radiator

The Young Radiator Co., Racine, Wis. announces release of a new oil cooler catalog. The 10 page, 2 color catalog lists complete data on Young oil to air and oil to water oil coolers for torque converters, industrial applications and marine transmissions. Information includes descriptions and photos on mobile and stationary applications up to 600 hp, diagrams of oil to air coolers for torque converters, hydraulic oil and lube oil with performance charts, diagrams of oil to air coolers including dimension tables, fan specifications and performance graphs. An analytic description of single-pass and two-pass liquid cooled shell and tube torque converter coolers complete the catalog. Request Catalog 1059. (ITS NEW)

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COMPRESSORS
Over the long haul, Quincy Compressors dependably deliver a maximum of low-cost, reliable air power for freight and passenger diesels.
If service is needed, it's available across the country and around the clock from any one of more than a hundred Quincy Authorized Service Depots.
Models for every need from 1 to 90 CFM. *Write for catalog today.*
QUINCY COMPRESSOR CO., Dept. DP360, Quincy, Ill.
Makers of the World's Finest Air Compressors

Roosa Master Fuel Pump Manufacture Expands Overseas

A new manufacturing company in France to be called Roto Diesel S.A. with a new factory at Blois on the Loire will manufacture the Roosa Master distributor type fuel injection pump to meet the requirements of European diesel engines in the Common Market Countries. Control of the new company is to be held jointly by C.A.V. Ltd., in England and the D.B.A. Group in France. The D.B.A. Group is the foremost motor and aircraft accessory group in that country. For years C.A.V. Ltd. researched the development of a distributor type fuel injection pump. Many designs were thoroughly tested with varying degrees of success. In 1953, reviewing their own work and that of others, attention was drawn to Hartford Machine Screw Co.'s Roosa Master pump. Agreements were concluded by the two manufacturers and in 1956 the pump was put into large scale production after more than 100 pumps had been field tested for over 150,000 hours with successful results. Today more than 250,000 pumps have been put into service by C.A.V. Ltd., under its license agreement with Hartford Machine Screw Co. in farm and construction equipment, buses, light commercial vehicles, taxis and private cars.

Valves Line Booklet

A four page booklet describing the Circle Seal line of valves is now available. The booklet contains technical data, construction details, dimensions, materials, operating principles, and how to order information. The booklet outlines details of Circle Seal check valves, relief valves, shutoff valves, plug valves, and custom valves. Write Circle Seal Products Co., 2181 E. Foothills Blvd., Pasadena, Calif. (ITS NEW)

United Electric Controls Has Canadian Facility

United Electric Controls Co., Watertown, Mass., manufacturers of temperature, pressure and vacuum controls, has announced establishment of a manufacturing facility in Canada. The new firm, whose name is United Electric Controls (Canada) Ltd. is located in Dorval, Quebec. Mr. Lorne J. Inglis has been appointed general manager. United Electric products are used in a variety of marine, industrial, aircraft and special purpose applications, such as space heating, ovens, refrigeration, engines, electronics, missiles and other fields. For further information, including new literature describing the products of the new company, Canadian readers can write Lorne J. Inglis, United Electric Controls (Canada) Ltd., O'Connell Ave., Dorval, Quebec, Canada.

Fittings, Couplings Catalog

Industrial catalog No. 204, containing descriptive information about Aeroquip hose, fittings, self-sealing couplings and related products, has been released by Aeroquip Corp. The catalog includes complete, up-to-date specifications concerning products for use on general industrial applications such as plant machinery, mobile equipment, oil field machinery, stationary power plants, etc. The catalog is available with either plastic binding or with a Kalamazoo-punched back, for easy inclusion in parts counter record systems. It is available from the Advertising Department, Aeroquip Corporation, Jackson, Michigan. Request Industrial Catalog #204. (ITS NEW)

NEW AND NOW AVAILABLE! The completely new 1959 edition of the **DIESEL ENGINE CATALOG,** Volume 24 can now be purchased. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, the Catalog is essential to you. This giant, 400 page, 10½" x 13½", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs $10 postpaid anywhere in the world. Send checks or company orders to **DIESEL ENGINE CATALOG,** 9110 Sunset Blvd., Los Angeles 46, Calif.

PROVIDENCE HOSPITAL, Seattle, Wash., installing Waukesha Diesel Enginator, 350 KW stand-by unit.

All Set!

This Seattle hospital is *all set* for a power failure emergency. Picture shows a big 11-ton Waukesha Enginator going into the power house basement. Automatically and immediately the necessary electric service is provided by this Diesel-fueled Waukesha Enginator. It's a Model LRDBCSU packaged unit, including all control equipment—350 KW, 120/208 volt, 60-cycle, 3-phase, 1200 rpm.

Everywhere large and small institutions are making their facilities as emergency-proof as possible, with the help of Waukesha Enginators. Backed by over 50 years of building heavy-duty engines and electrical equipment, Waukesha Enginators (engine-generator combinations) have a world-wide record of proven reliability. Diesel and carburetor fuel models . . . all standard AC voltages . . . up to 800 KW. Send for literature.

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WAUKESHA ENGINATOR
Special Products Division
WAUKESHA MOTOR COMPANY, Waukesha, Wis., New York, Tulsa, Los Angeles

472

Leake Rocker Arm Acquired by Laminated Shim Company

The rights to manufacture and distribute the Leake Rocker Arm for internal combustion engines have been acquired by the Laminated Shim Co. of Glenbrook, Conn. A unique feature of the Leake arm is that it can be stamped in its finished form from a single piece of steel. Inventor of the stamped rocker arm is James M. Leake, Sr. who, with the acquisition of the assets of the Leake Engineering Company of Monroe, Mich., now joins the Glenbrook company in a full time engineering capacity. Mr. Leake has more than 35 patents in the stampings field to his credit, including a number of stamped rocker arm patents that have resulted in the production of many millions of arms during the past twenty years.

Leake Rocker Arm

Waukesha Motor Appointments

Two new appointments have been made at Waukesha Motor Co., according to an announcement by James E. DeLong, president. Mr. Frederick J. Gunther has been named product manager of the Marine Engine and Public Works Divisions and

F. R. Gunther

R. A. D'Amour

R. A. D'Amour has been appointed assistant sales manager. Mr. Gunther joined the Waukesha Motor Company in 1940 after serving as an instructor of automotive engineering at Purdue University. He has served in various capacities in the sales department, and has recently concentrated his activities in the sales and applications of the marine and public works markets. Mr. D'Amour joined Waukesha Motor Co. in 1952 and has served for the past seven years as sales engineer with a territorial assignment in the Midwest area. He was formerly with the Cummins Engine Co. as a sales engineer and was appointed assistant regional manager of the Washington, D. C. area by that firm in 1950. He held that post until he transferred to the Waukesha Motor Co. sales organization.

Tug Repowered by Superior Oil

An "old hand" with new muscles, is evident in the Superior Oil Company's tug boat *SUPCO "5"* recently repowered with the new General Motors 12V-71 marine diesel engine. The 80 ft. long vessel features two of the new "V" series General

Motors diesel marine propulsion engines driving twin screw propellers. The power application and supply of the engines was made by Stewart & Stevenson Services, Inc., Houston, Tex. The engines are rated 335 cont. hp with heavy duty 6:1 ratio marine reverse and reduction gears. Each engine turns a 70 in. diameter by 50 in. pitch 3-blade propeller with a propeller speed of 300 rpm. Superior Oil Co. is using the *SUPCO "5"* for general towing work which includes the moving of big offshore drilling rigs off the Texas and Louisiana coast. Her owners report that the vessel can do 13 mph running light and when under full tow, has been developing a speed of seven to eight mph.

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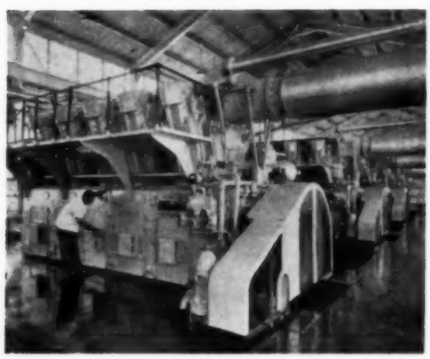
AP935

Anderson Appointed Fairbanks-Morse Executive V. P. For Operations

G. R. Anderson

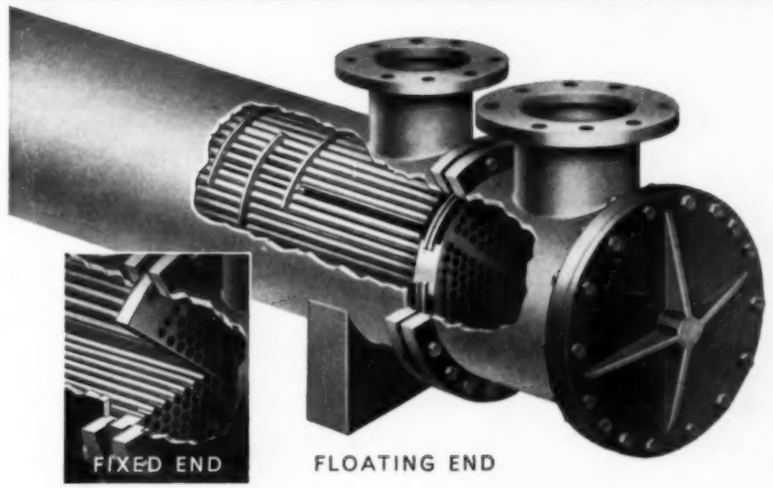
Gordon Rowen Anderson, engineer and inventor who holds 25 patents in the electrical field, has been appointed executive vice president, operations, at Fairbanks, Morse & Co., it was announced by Robert W. Kerr, F-M president. Mr. Anderson has been with Fairbanks-Morse for 37 years. The office of executive vice president, operations, is a new creation. Mr. Kerr said it is "designed to strengthen the management of a company that is moving ahead as rapidly as ours." Mr. Anderson will have authority over divisional manufacturing, engineering, and reasearch operations. Mr. Anderson is a Canadian by birth and a World War I veteran of the U. S. Army. The appointment means his promotion from his position as vice president, general manager of the Beloit Division, Beloit, Wis. H. E. Hanson will become acting manager of the Beloit Division. The Beloit Division manufactures a wide range of products from magnetos to the company's heavy machinery-diesel engines and generators, large pumps, large electric motors, railway equipment, and compressors. Mr. Anderson is a life member of the American Institute of Electrical Engineers, and a member of the American Society of Mechanical Engineers. He is a past chairman of the motors and generators section of the National Electrical Manufacturers Association.

Compressor Units Reach 1-Million Hour Mark



More than one million hours continuous operation without breakdown is the record of this bank of 15 Cooper-Bessemer 2400 hp 10 cylinder gas engine compressors. They are installed at the Edgar G. Hill compressor station of Michigan-Wisconsin Pipeline Co., Hansford County, Tex. Compressors have operated for 10 years with an average monthly operating and maintenance cost of $2.03 per installed hp. Units pump 343-million cu. ft. of natural gas every 24 hrs., at discharge pressure of 975 psia. Gas is delivered to customers in Michigan and Wisconsin, 1200 mi. away. The Edgar G. Hill station is said to contain largest aggregate compressor horsepower in the world under one roof. Compressors were built by The Cooper-Bessemer Corp., Mount Vernon, O.

PERFORMANCE THAT CREATES SATISFACTION!



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Florida Diesel News

By Ed Dennis

SHIPPED to Wolf Indorf of Caracas, Venezuela, a 40 ft. Pace sport-fisherman sedan, powered by a pair of General Motors 4-53 marine diesel engines rated 120 shp at 2800 rpm, with Borg-Warner 2:1 r&r gears and 20 x 22 Columbian three bladed propellers. Top speed is 21 knots; from Miller Yacht Sales, Fort Lauderdale.

DOWN at Kendall, the Arvida Orchards Co. took delivery of a model AC-2 American Marc two cylinder air cooled 16 bhp diesel to power a Berkley irrigation pump supplying water to 168 sprinkler heads at an estimated rate of 1344 gpm.

DIESEL Engine Sales delivered 19 shrimp trawlers to El Salvador, San Salvador, C. A. All are powered with D342 Caterpillar marine diesel engines. Five of them went to Compania de Inversiones, S. A. and six to Pezca, S. A. and the rest to other shrimp producing firms in San Salvador.

BART W. Patrick is the new branch manager at Jacksonville for the Detroit Diesel Engine Div. of GM. He served in Sales and Promotion at the Detroit factory and also spent about nine years in the field as a sales manager. He replaces Roy Kuhns who is retiring after being associated with GM in Jacksonville since 1943.

TWO Waukesha Enginators for Horseshoe Beach McDill Air Force Base, powered by model 135 DKB Waukesha diesel engines, 50 kw Electric Machinery generators, radiator cooling and electric starting, from Simplex Sales of Miami.

TWO Allis-Chalmers crawler tractors are working for the Hubbard Construction Co. at the Orlando Municipal Airport. The HD21 is powered by an Allis-Chalmers 21000 four cycle turbocharged diesel rated 225 hp at 1825 rpm and the HD16 tractor is powered by a model HD844 diesel with 163 hp. The fill material needed to achieve the proper grade will amount to about 302,000 cu. yd.

A MODEL 3MDSP Onan 3 kw diesel generating set installed on the 48 ft. *Fran-Joel III*, owned by Sam Wecksler. The main propulsion is a pair of GM 4-71 marine diesel engines with 1.5:1 Paragon r&r gears from Ellis Diesel Sales & Service at Fort Lauderdale.

FOUR DW21 Caterpillar two wheel tractors powered with six cylinder turbocharged 300 hp Caterpillar diesel engines for Bransfield & White of Ojus and a D8 Cat, 190 hp, dozer and a #12 motor grader with a 115 Cat diesel engine for road construction work at Carol City, from Shelley Tractor & Equipment Co., Miami.

FOR the Mid-South Towing Co., to operate from Tampa, a new 156 x 35 x 8 foot twin screw, towboat powered by a pair of 10 cylinder 1600 hp Fairbanks-Morse marine diesel engines; to be constructed by the St. Louis Shipbuilding and Steel Co.

CURRENTLY being used in the construction of the Orlando Expressway, three model C Le Tourneau-Westinghouse Turnapull scrapers powered with General Motors V8 diesel engines of the 71 series and Fuller transmissions, by Robert L. Clark Corp. plus three model D Turnapulls with General Motors 4-71 diesel engines from Adams Construction Equipment Co.

THE Parsons Bros., a west coast marine construction company, had a four cylinder 68 hp Ford diesel engine with 2:1 Borg-Warner r&r gears installed in their 30 ft. utility and tow boat, it turns a 25 x 14 propeller. The Ford diesel was marined by Modern Diesel Power Co. of Tampa. Simms fuel injection systems are used on these diesel engines.

THE Polk County Commissioners took delivery of a No. 118 Galion motor grader powered with a International UD 554 diesel engine. This six cylinder 554 cu. in. diesel is rated 150 max hp at 2300 rpm; from Florida Georgia Tractor Co., Tampa.

AMONG the dozen or so pieces of dieselized equipment owned by R. E. Slaver of Tampa are two model 210 Michigan tractor scrapers (19 yd. cap.). These are powered by model NTO-6-BI turbocharged Cummins 262 max hp diesels, Clark torque converters 3.0:1, four speed transmissions and Clark planetary wheel axle.

TWO No. 9000 White hi-way tractors with Cummins engines were delivered to Central Trucking Co. of Tampa. One had a JT6B turbo-charged six cylinder diesel rated 180 hp at 2100 rpm and the other had a NH180 naturally aspirated Cummins rated 180 hp at 2100 rpm. Both have Fuller transmissions.

OVER at Olga, Harper Bros., Inc. are working two DW21 Caterpillar two wheel tractors powered with 300 hp turbocharged Cat diesels for the No. 470 scrapers and a Cat D8 bulldozer, 190 hp, to push load the fill needed in the construction of the approaches of the new bridge over the Caloosahatchee River.

REPOWERED from gasoline to a model C-175 Cummins diesel, a No. 9000 White hi-way tractor for the Sunbeam Systems of Miami to haul orange juice tankers. This Cummins is rated 175 hp at 2500 rpm, has a Fuller five speed transmission and a 15 in. diameter Long clutch plus an oil cooled turbocharger; at the shops of Cummins Diesel Sales in Hialeah.

A MODEL 4-53 General Motors diesel rated 107 hp at 2200 rpm was installed in a Mayhew drilling rig owned by Pan American Equipment Co. and a 3-53 model, rated 86 shp at 2800, was installed in a motor sailer owned by Woody Pirie at Dinner Key.

ELLIS Sales & Service of Fort Lauderdale repowered from gasoline, a GM 664 hi-way tractor for R. H. Wright with a General Motors 4-71-E diesel rated 145 hp at 1200 rpm. Also included was a Lipe-Rollaway clutch and a four speed Brown-Lipe auxiliary transmission.

THE *St. Mary*, a 45 ft. oyster boat owned by Luke Tesvich of Lafayette, La., was repowered with a three cylinder model 387-C-18 MK P&H diesel engine. It is rated 90 cont. hp at 1800 rpm turning a 28 x 20 five blade Michigan propeller through Twin Disc 2:1 r&r gears for a speed of about 12 mph.

New Generator Control Panel

The Simplex Co. has announced a new wall or generator mounted unit to provide both automatic and manual voltage regulation plus essential meters for ac generators from 5 to 250 kva. All controls are located on the front panel for ease of operation. Hinged front panel plus large knockouts at bottom and rear provide rapid installation and service. Standard units are available from stock with any combination of two or three indicating meters. Extra controls and meters may be added as required. Bulletin 2A-1261-b is available from The Simplex Co., Inc., Springfield, Ill.

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Mid-West Diesel News

By L. H. Houck

HERCULES has a number of its new light-weight low-cost truck diesels on experimental runs about the country. The new D-298-H, 6 cyl., 115 hp, 3000 rpm, weighs only 850 lbs., and sells for $1400. It is available in hp's of 50 to 175. Motor Cargo, Inc., Akron, is trying some in its 2000 unit fleet, on 20,000 to 22,000 gvw vehicles.

INLAND GM Diesel, Inc., Milwaukee, has installed an 8V-71 GM in a Sicard rotary snow plow owned by the Kenosha County Highway Dept.

MARINETTE Marine Corp., Marinette, Wis., has installed a 3-53 GM marine diesel unit in a 45 ft. auxiliary boat. Delivery by Inland, Milwaukee.

INTERNATIONAL TD-6 and Drott loader to Richard E. Harder, St. Louis, from Mo.-Ill. Tractor Co., St. Louis.

INTERNATIONAL TD-15 and dozer equipment to Noble N. Shannon, Cahokia, Mo., for general contracting work, from Mo.-Ill. Tractor Co., St. Louis.

FIFTY new dieselized buses, GM's, put in service by Public Service Co., St. Louis, at a cost of $1,500,000, have been named "Crystaliners" in a "Name-the-Fleet" contest. Name selected from 4000 entries. All units are air-conditioned.

ARING Equipment Co., Milwaukee, a GM dealer, delivered and installed a GM 3055C in an A-W road grader.

INTERNATIONAL TD-15 and dozer to Russell Sohn, general contractor, Jackson, Mo., from Mo.-Ill. Tractor, St. Louis.

MID-WEST dealers for American MARC, Inc., outboard motor manufacturers, will offer the first diesel outboard this spring. W. Denis Kendall, president, Inglewood, Calif., said the firm has 60,000 firm diesel orders for outboards.

ILLINOIS Dept. of Public Welfare has placed a new hospital bus in service powered with a Fageol-Leyland diesel, made by Highway Products, Inc., Kent, Ohio, which acquired Twin Coach metal fab division two years ago and recently bought the Fageol engine building subsidiary.

LITTLE ROCK Road Machinery Co., followed introductory showing of the new International TD-25 with a one week open house celebration, which required 75 persons, including factory reps, to show slides and furnish information and entertainment.

INLAND Diesel, Inc., Milwaukee, has installed a GM diesel in an A-W 99 road grader for Walworth County Highway Dept. Engine was a 4055C GM 4-71.

CUSTOM Dredging Co., LaCrosse, Wis., took delivery on a GM 4-71 diesel, fabricated to a heat exchanger cooled unit by Inland GM, for use with a dredge pump.

INTERNATIONAL TD-15 with dozer equipment to Goodman & Smith, Vandalia, Mo., from Mo.-Ill. Tractor Co., St. Louis.

MO.-ILL. Tractor Co., St. Louis, delivered a TD-6 and Drott to H. D. Braun, St. Louis, for general contracting work.

OBSERVED: TC-12 twin-powered Euclid tractor, Euclid S-18 scrapers and new Euclid C-6, all GM diesel equipped, working on Arkansas Interstate, south of Little Rock.

INLAND GM Diesel, Inc., Milwaukee, has installed a 4-53 GM diesel in a White 3000 Tilt-Cab for Hillside Transit Co., Milwaukee.

RIEMER Bros., heavy excavating contractors, Chicago, used an International Drott TD-6 4-in-1 multipurpose bucket to move steel wire rolls of concrete reinforcing wire on the new Ansco building job in Chicago. The contractor owns seven other International crawlers.

UTAH Division, Thiokol Chemical Corp., at Tremonton, Utah, has added 17 dieselized trucks to its 93-unit leased International fleet as a part of its expansion program. All units are Internationals supplied by International dealer, Harris Truck & Equipment Co., Tremonton.

Expand Sales Operations

Steadily-increasing sales of International engines have necessitated the establishment of regional offices in New York City; Melrose Park, Ill.; Dallas, Tex.; and Oakland, Calif., it was announced by C. E. (Skip) Jones, engine sales manager of International Harvester Co.'s Construction Equipment Division. Eastern Region headquarters are located at 10 E. 40th St., New York City. The regional supervisor will be appointed later. A. W. Meyer is the North-Central regional supervisor, with headquarters at the company's Construction Equipment Division headquarters in Melrose Park, Ill. Southwest Region headquarters are at 1809 S. Lamar St., Dallas, with L. E. Muzzy as regional supervisor. The Western regional supervisor, headquartered at 2858 Cypress St., Oakland, Calif., will be named shortly. A. W. Meyer, North-Central regional supervisor, was manufacturer sales supervisor, while L. E. Muzzy, Southwest regional supervisor, was distributor sales supervisor.

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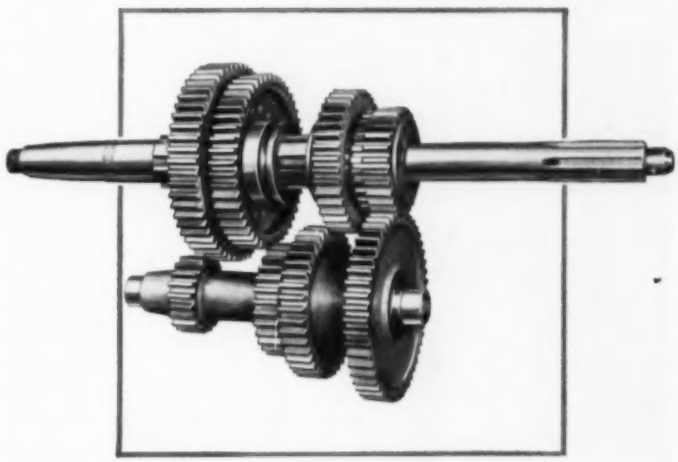

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Electric Power Sales by REA Borrowers Rise

Rural electric systems financed by the Rural Electrification Administration sold 15.5 per cent more electricity and connected 10,000 more consumers in 1959 than in 1958, the U.S. Department of Agriculture announced. Sales in 1959 totaled 25.3 billion kwh, compared with 21.9 billion kwh the year before. The big increase reflected both the greater use of power by consumers already connected and the demand of 139,000 consumers added to the rural lines in 1959.

"The rise in the number of rural consumers and the demand for more electric power by those already on the lines are signs of the many changes taking place in rural America," commented REA administrator David A. Hamil. "More and more farmers are using electricity to handle farm chores automatically. Rural businesses and suburban developments are on the increase, too. Five out of six consumers added to REA financed lines in the continental United States during 1959 were non-farm consumers."

Financial condition of the borrows continued to improve, REA reported. Net worth of the electric borrowers as the year ended was $602 million or 18.2 per cent of total assets. At the close of 1958, net worth stood at 16.6 per cent of total assets.

During the year, REA approved electric and telephone loans in the amount of $279.3 million.

Highlights of a year-end report by REA included:

Percent of Farms Electrified. The year ended with better than 96 per cent of all U.S. farms electrified, with facilities financed by REA serving slightly more than half.

Consumers. Farmers and other rural consumers served and scheduled to be served by the systems reached 5,228,000. The borrowers connected 139,000 consumers during the year, an increase of about 10,000 over the previous year. They now provide electric service for 4,736,000 consumers.

Loans. During the year, REA approved electric loans totaling $171.9 million. This brought the cumulative total of loans made in the 24½-year-old program to $4,011 million. Funds advanced to the systems climbed to $3,474 million. REA now has 987 active borrowers.

Purpose of Loans. About 71.1 per cent of the 1959 loans will finance system improvements and new distribution facilities. An estimated 27.4 per cent, or $47.1 million, will finance new generation and transmission facilities. The remaining estimated 1.5 per cent will finance consumer facilities. Through the end of 1959 REA had approved about $911 million in loans for generation and transmission facilities, including approximately 2,244,000 kw of generating capacity.

Power Generated and Purchased. The borrowers generated 4.9 billion kilowatt-hours of power in 1959, an increase of 41.7 per cent over 1958. Excluding sales between borrowers, they purchased 24.2 billion kwh, surpassing 1958 by 12.6 percent. Net sales reached 25.3 billion kwh, up 15.5 per cent over the previous year. Input of power on a net basis was 29.1 billion kwh, a 16.6 per cent increase over 1958.

Revenue per Kwh. While consumption of electric power was climbing, the average price per kilowatt hour to consumers was declining. It dropped from an average of 2.48 cents per kwh for all types of consumers in 1958, to 2.36 cents in 1959. Cost of electricity to residential consumers, including farmers, dropped from an average of 2.65 cents per kwh in 1958 to 2.52 cents per kwh in 1959. In 1958, the average monthly residential bill was $8.23; in 1959, $8.64.

Operating Revenues and Margins. Operating revenues rose 9.8 per cent in 1959, totaling an estimated $618.3 million for the year. Net margins totaled an estimated $87.7 million, an increase of 16.6 per cent over margins for 1958 after deductions for expenses, depreciation and interest.

Repayments. REA electric borrowers made payments to the Government totaling $145 million during 1959. This figure includes payments principal and interest due, plus an additional $15.2 million in payments made in advance of due dates. The balance of advance payments which electric borrowers have with REA now stands at $154.1 million. Including that amount, borrowers have repaid more than $823.4 million on the principal of their loan obligations. They have also paid $397.1 million in interest.

Associated Adds 100 Tractors

Associated Transport, Inc., New York, is increasing the size of its truck fleet with the addition of 100 International diesel highway tractors, it was announced by B. M. Seymour, president. Cost of the truck purchase is more than $1 million.

Seymour said the new Internationals will join the Associated Transport fleet as part of a long-range expansion program to improve service to shippers. Among recent fleet additions were another 100 International diesel tractors, which were delivered in June, 1959.

Associated Transport is one of the nation's largest motor freight haulers on the Eastern seaboard. It operates a fleet of more than 4,600 road trucks and trailers, serving the highly industrialized area bounded by Boston and Buffalo on the north, Cleveland and Cincinnati on the west and Atlanta and Charleston on the south. Twenty of AT's new trucks are International model DCO-405 cab-over-engine tractors rated at 68,000 lbs. gcw. The other 80 units are recently-introduced model BC-225-DL lightweight tractors. Gcw is 68,000 lbs. Both International tractors are equipped with Cummins NH-220 engines, five-speed overdrive transmissions and two-speed rear axles. They will pull 35 and 40-foot trailers throughout the AT system.

Turner Sales Manager

Appointment of Monroe L. Stark as sales manager of the Turner Corp., Sycamore, Ill., has been announced by W. F. Vanderbeek, vice president of the firm. Mr. Stark has been with the Turner Corp. since 1942, and has served in various capacities, most recently as assistant sales manager. The firm manufactures and markets propane torches and accessories for home and professional use, Quick-Start diesel starting systems, and equipment for the plumbing, heating, and air conditioning industries.

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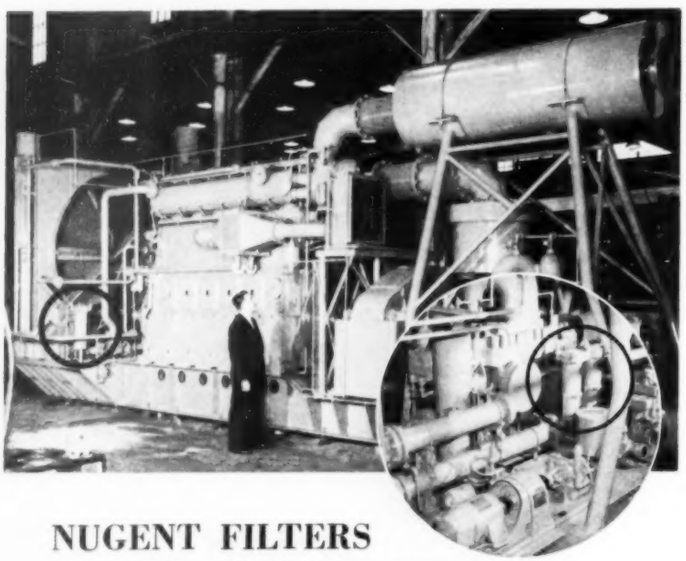

NUGENT FILTERS serve diesel-driven pump in Sheikdom of Kuwait

Nugent lube and fuel oil filters provide maximum filtering protection for this skid-mounted pump package. One Nugent 1555-4S laminated fiber disc filter handles the lube oil for the 1000 HP Enterprise Diesel Engine powering the crude oil pump. Two 1555-4S units operating in parallel filter the heavy crude fuel oil consumed by the engine. The equipment is now in service in the Sheikdom of Kuwait on the Persian Gulf.

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New Tournapull Transmission

Two transmissions are now available for the model D Tournapull as announced by LeTourneau-Westinghouse Co., Peoria, Ill. Equipment users have their choice of a torque converter or conventional manual shift type transmission. The new torque converter version of the prime mover can be had with any of the standard "D" size interchangeable trailing tools, including the 9 yd. scraper, 11 ton rear dump or 10 ton mobile crane. The unit retains its 143 hp GM diesel engine. The new transmission is being built for L-W by the Allison Division of General Motors Corp. It consists of a single stage, multiple phase, four element torque converter combined with a heavy duty, power shift gear box. Four forward and two reverse ranges provide the equivalent of an infinite number of gear ratios with speeds up to 30 mph. Further information and full specifications on the torque converter equipped D Tournapull is available through local L-W distributors.

Names Southeast Sales Manager

Appointment of James A. Seaman as southeastern sales manager was announced by officials of Van Norman Machine Co., a division of Van Norman Industries, Inc. Mr. Seaman will assume his new duties immediately with headquarters in Atlanta. In his new position, Seaman will supervise and assist sales and service personnel on the Van Norman line of machine tools and automotive equipment. The territory covers Florida, Georgia, Alabama, North and South Carolina, Mississippi, Arkansas, Tennessee, and Virginia. Mr. Seaman for the past two years has been district sales manager for the southern states, and from 1954 to 1957 was district sales manager for the midwest and east coast. He joined the firm in 1950 as a service engineer for the machine tool and automotive maintenance equipment, working in that capacity for four years.

Trucker Adds 15 Diesels

M&P Transport Ltd., Edmonton, Alberta, has announced the addition of 15 Cummins diesel-equipped tractors to its fleet providing transcontinental service between Ontario and Alberta via the United States. The tractors are International Harvester model DC 405's powered by 220 hp Cummins diesel engines. They join Cummins-powered Kenworth and Hayes tractors already in service. M&P operates nearly 100 vehicles, including 25 Cummins-powered diesel tractors. M&P Transport Ltd. employs more than 100 persons and does an annual business of $1,500,000. It was founded in 1949 to provide service to Northern Alberta points. Soon the company was transporting goods across Canada, using gasoline tractors and single axle trailers. Mr. H. S. Parker, president and general manager, foresaw the opportunities in Western Canadian Trucking while in London, England, in 1948. He emigrated to Canada to carry out his ideas, with the result that M&P Transport Ltd. is today one of the leading carriers in Western Canada. They interline with U. S. transporters at Detroit and Buffalo and Northern Transport companies in Edmonton, giving Eastern U. S. shippers service as far north as Alaska.

Open Regional Warehouse

A 20,000 sq. ft. warehouse and regional office building featuring "same-day" customer service has been opened in Cincinnati by Dayton Industrial Products Co., a division of the Dayton Rubber Co. The new building is the fifth warehouse and regional sales office established this year for DIPCO's products, according to Robert G. Burson, vice president. Other warehouses and offices were established during the year in Dallas, Atlanta, Hillside, N. J., and the division's headquarters near Chicago. Ground was broken at the same time for a 13,000 sq. ft. warehouse addition next to the new modern brick and concrete structure.

B & W Gets Brazil Order

Burmeister & Wain have concluded a contract for delivery of 37 stationary diesel electric sets to Brazil. The engine-generators will be put to use in a great expansion of the power production in the state of Rio Grande do Sul. Rio Grande do Sul is the southernmost of the Brazilian states and covers an area of some 300,000 sq. miles. It is thus seven times as big as Denmark and about the same size as Western Germany. The state has only 3 million inhabitants, but with the electrification it is intended to create facilities for a rise in the industrial activity in the state with ensuing greater possibilities of employment. The contract for delivery of the 37 diesel-electric plants was concluded with Comissão Estadual de Energia Eléctrica (CEEE), Porto Alegre, a Government organization which handles everything concerned with the supply of electricity in Rio Grande do Sul. The order comprises 20 diesel engines of B&W's type 620-MTBS-30, each developing 300 bhp, corresponding to 200 kw, and 17 diesel engines type 535-VBS-62, each of 1,400 bhp, corresponding approximately to 950 kw. The engines are to be coupled to generators, and these diesel-electric plants represent a total output of abt. 30,000 bhp, corresponding to rather over 20,000 kw. The first plant will be delivered in the autumn, and the order will subsequently be effected in the course of a year and a half.

ALCO, British Firm in Locomotive Agreement

ALCO Products, Inc. announced that it has concluded an agreement with Associated Electric Industries, Ltd., of London for joint collaboration in the design, manufacture and sale of diesel-electric locomotives for world markets. ALCO said the arrangement was effective immediately. It covers the design and manufacture of locomotives of 900 hp and higher. Associated Electrical Industries, the largest manufacturer of electrical equipment in the British Empire, has operated under the names of Metropolitan-Vickers and British Thomson-Houston.

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On heavy earth-moving equipment each component must be engineered to withstand severe working and climatic conditions. Young has designed and developed cooling equipment that is both rugged and dependable . . . radiators, oil coolers, torque converter oil coolers and heat exchangers are job-proved *where the going is tough.*

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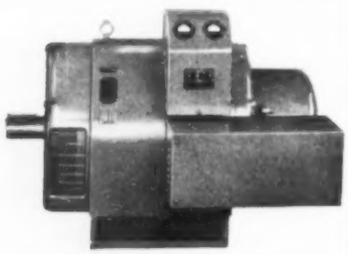
AMP-PAK



AMP-PAK Generator shown is rated at 187 kva, 1200 rpm, 240/480 volts. AMP-PAK is available in ratings of 75 thru 187 kva at 1800 rpm and 62½ thru 187 kva at 1200 rpm. Three phase, 80% PF, 60 cycles, 50C rise, and 120/208, 240 and 480 volts.

No exciter . . . No moving parts in the voltage regulator

AMP-PAK is a compact, revolving field a-c generator with built-in, static excitation system; static voltage regulator; and basic metering and controls conveniently grouped. AMP-PAK is a portable unit, factory assembled, internally connected, and tested.

No rotating exciter to maintain. D-C excitation is provided by a heavy duty, long-life, static rectifier.

No tubes, relays, vibrators to service. Voltage is regulated by a static, E-M-developed sensing circuit and "magical" magnetic amplifiers.

Holds voltage "rock-steady" so your motors, lights, and electronic equipment will work better. The static regulator provides ±2% regulation.

Starts big motors. A special, built-in voltage booster transformer stands by to reinforce line voltage when heavy loads are suddenly applied.

Easy to install. Needs no switchboard. Just connect load to AMP-PAK thru a suitable line switch.

Simple to operate. Has no belts, no "tricky" commutator, no adjustments — anyone can operate AMP-PAK.

See your nearest E-M Sales Engineer and write the factory for publication PRD-236.

E-M

ELECTRIC MACHINERY MFG. COMPANY
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Largest manufacturer of "Packaged" Generators

2100-TPA-2154

Baltimore GM Servicemen In Service Guild

Four members of the service staff of Galvin & Taliaferro, Inc., GM diesel distributor in the Baltimore area have qualified for membership in General Motors' newly established Service Craftsmans Guild. The men are Charles Dorrett, Arthur F. Ecker, Robert M. Meluh and William J. Hrebik. Examinations conducted by service representatives of the Division's New York regional office covered product knowledge, the latest factory-approved servicing procedures and customer relations.

Boeing Turbine Service Increased

Boeing is stepping up its gas turbine service program with assignment of five field service representatives to key areas in the nation. The industrial products division employees and their assigned areas are Warren Wheeler, Los Angeles; Bernard Sternke, Seattle; Jim Schubert, Chicago; John Crowley, Miami, Florida; and Harley Bowdish, New York. The men will service the small Boeing gas turbines in their areas. Also trained in Boeing small gas turbine service are 45 Boeing transport division representatives stationed throughout the world on the 707 Jet Stratoliner program. Boeing is producing the 320 lb., 240 hp small gas turbine, the 502-10C, and its 205 air hp turbine-driven compressor counterpart, the 502-11B, used in the Boeing Turbo-Starter jetliner ground support unit.

Dravo Chairman, President

Election of Carl B. Jansen as chairman of the board and chief executive officer and William E. Clark as president and chief operating officer of Dravo Corp. has been announced. Mr. Jansen, who has been president since 1946, succeeds William K. Fitch who retires December 1 after 46 years service with the company. Mr. Clark has been executive vice president since 1955. A graduate of Union College, Schenectady, N. Y., Jansen began his business career with Dravo as a field engineer in 1922. He is a director of the United Fund of Allegheny county and past president of the Community Chest; a trustee of Union College; vice chairman and director of the Regional Industrial Development Corp., Pittsburgh; and vice president and member of the executive committee, Allegheny Conference on Community Development. Mr. Jansen is a member of the American Society of Civil Engineers, American Society of Mechanical Engineers, Engineers Society of Western Pensylvania, Society of Naval Architects & Marine Engineers, Society of American Military Engineers, American Ordnance Association and the Chamber of Commerce of Pittsburgh.

A graduate of Ohio State University, Clark joined Dravo in 1930. During World War II, he was administrative manager of the company's Wilmington, Del., shipyard. He served as general manager of both Keystone division and engineering works division of Dravo, became a director in 1946 and was elected vice president in 1948. Mr. Clark is a member of the Society of Naval Architects & Marine Engineers, American Ordnance Association, National Defense Transportation Association and the Pittsburgh and Pennsylvania Chambers of Commerce. Both Mr. Jansen and Mr. Clark are directors of Dravo subsidiaries Union Barge Line Corporation, Dravo-Doyle Company and Dravo of Canada Limited.

Tube Fittings Finder

A four page folder offers condensed information to help select proper fittings for various service and installation requirements. The folder includes shape charts for six types of industrial tube fittings and illustrations of tube-working tools. Bulletin 4306B1 is available from W. D. Wynant, Parker Fittings & Hose Division, Parker-Hannifin Corp., 17325 Euclid Ave., Cleveland 12, Ohio.

Co-op Adds Internationals

Consumers Cooperative Association has announced the purchase of ten diesel equipped International truck-tractors as part of a fleet modernization program. The new trucks are International compact-design highway units rated at 68,000 lbs. gcw and are equipped with five-speed transmissions and two-speed rear axles. Power is provided by Cummins NH-220 diesel engines rated at 220 hp. The international diesels will be placed in gasoline transport service by Consumers Cooperative Association, replacing gasoline-fueled tractors. The association operates 120 trucks that travel approximately eight million miles a year.

B&W Engine in Record Ship

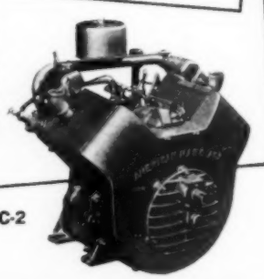
The Peruvian Navy has taken delivery of the tanker *Zorritos*, which with a deadweight capacity of 6,000 tons, said to be the largest ship so far built in South America. The ship is equipped with a five-cylinder B&W diesel engine of the type 62-VTF-115, developing 3,000 IHP, corresponding to 2,400 BHP, at 120 rpm. This machinery gives the ship a speed of 12½ knots, fully loaded. The tanker *Talara*, built by Burmeister & Wain, and the British-built tanker *Sechura*, delivered to the Peruvian Navy around Jan. 1, 1955, are equipped with B&W engines of the same type.

AMERICAN MARC delivers the goods

American MARC Inc. brings the advantages of diesel power to manufacturers of equipment requiring 9 to 28 HP. They can now provide efficient diesel performance, longer engine life and assured economy to users requiring **continuous** dependable service. AMARC diesels are lightweight, too, due to utilization of new aluminum alloys which make them especially suitable for refrigerator cars and trucks, and portable generators.

For more specific information or application assistance write or call American MARC Inc., 1601 W. Florence Ave., Inglewood, Calif. ORegon 8-7174.

American MARC builds air and water cooled diesels from 9 to 28 HP; permanent magnet, static excited and brushless generators up to 100 KW; diesel-generator sets from 2½ to 10 KW, and the unique AMARC 10, the world's first diesel outboard engine.



model AC-2

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Gas Injection Bulletin

A new bulletin by Clark Bros. Co., presents a report on Arabian American Oil Co.'s new gas injection project in 'Ain Dar, Saudi Arabia. Written by John W. Barker of Aramco, the article describes this $30-million project which will gather and inject 210,000,000 cu. ft. of gas per day in the Ghawar field. All details of the operation are covered including the use of five series connected Clark gas turbines for compressor drive, plus the use of an additional turbine to drive a 5600 kw generator to power the gas-oil separator plants. Copies of Bulletin 183 can be obtained by writing to Clark Bros. Co., Olean, N. Y. (ITS NEW)

Chilean Research Vessel

The University of Chile will shortly take over a modern marine and fishery research vessel. The duties of the new ship will include detection of new fishing grounds and experiments to establish the most efficient methods of exploiting the great abundance of fish in Chilean waters. She is equipped with a B&W Alpha diesel engine. The vessel is being built at the Bremen Yard in Valparaiso. Her dimensions are: length 22.7 metres, breadth 6.2 metres, and displacement 110 tons. There are two laboratories on board and cabins for four researchers besides accommodation for a crew of eight. One of the two holds is appropriated for gear used in marine research and experimental fishing, while the other hold is arranged with refrigeration and thermal insulation for a cargo of 15 tons of fish. The 4-cylinder B&W Alpha engine of the type 340-V develops 220 hp at 450 rpm. It is provided with controllable pitch propeller to facilitate special manoeuvres during marine or fishery research work. The cruising speed will be 9 knots, and the vessel's radius of action, 2,000 miles.

Suntide-Sunray Merge

A resolution to merge Suntide Refining Co., into Sunray Mid-Continent Oil Co., effective with filing and recording a certificate of ownership and merger in Delaware has been approved by Sunray's board of directors at its quarterly meeting. Sunray presently is the owner of 3,076,288 shares (98.4%) of the capital stock of Suntide Refining Co. The action follows a plan of reorganization entered into between the two companies under which Sunray will exchange one share of Sunray common stock for each three shares of the capital stock of Suntide. Suntide operates a modern 55,000 bbl. day refinery on Nueces Bay, Corpus Christi, Tex. The refining and crude oil purchasing business acquired from Suntide by Sunray pursuant to the merger will be operated by a new wholly owned subsidiary, Suntide Refining Co. Mr. G. E. Wynn, Tulsa, remains as president of the Suntide organization and the present Suntide organization will continue to operate the Suntide business. Directors of the new Suntide organization are: Paul E. Taliaferro, R. W. McDowell, G. E. Wynn, T. E. Fitzgerald, and R. Paul Henry.

1,300 Ton Trawler Built in Vienna

In Vienna, a new trawler of 1,300 gross tons is being made ready for its first trip. The trawler has been built at the yard Schiffswerft Korneuburg and is equipped with two B&W ALPHA diesel engines of 720/800 BHP each, with controllable pitch propeller. The vessel is built to the order of the Greek owners, Great Fishing Enterprise "Evangelistria", Piraeus, and has the following main dimensions:

Length o.a.	75.92 m,
Length b.p.	64.89 m,
Breadth	11.20 m,
Height to first deck	7.30 m,
Height to second deck	4.90 m,
Draught	4.80 m,
Speed	13.5 Knots

The rather unusual event of launching a fishing vessel in the heart of the European continent was reported in television, radio and the press. The trawler's delivery trials will take place on the Danube at Brăila, from where it will proceed to Piraeus to pick up crew and fishing gear.

Named Chief Engineer

Ross W. Colebrook has been appointed chief engineer—hydraulic drives for The National Supply Co. He will be responsible for the production designs of hydraulic couplings and torque converters. He will have his headquarters at the company's technical center, at Allison Park, Pa., near Pittsburgh. Mr. Colebrook joined National Supply in 1948 as a member of its first training program for college graduates. He has served in the general engineering department at Toledo and Pittsburgh, and as a development engineer at Houston. In January, 1959, he returned to Pittsburgh as senior development engineer.

Distributor Named

Franchisement of C & E Roth Tool & Supply Co., of Albuquerque, N. M., as an authorized distributor is announced by D. A. Cameron, general sales manager-distributors, Parker-Hannifin Corporation. The new distributor will handle Parker industrial tube and hose fittings, made by the corporation's Parker fittings & hose division and Crown compressed air line lubricators, filters and regulators made by Hannifin company division.

Minneapolis-Moline Purchases California Electronics Firm

Minneapolis-Moline Company, manufacturers of industrial, construction and agricultural machinery has acquired the Hymac Electronics Corp., designers and producers of electronic instrumentation and test equipment for industry and government. The announcement was made by J. Russell Duncan, president of Minneapolis-Moline. Hymac Electronics, located in Culver City, Calif., was purchased for cash by Minneapolis-Moline and will operate as a subsidiary company. It designs and manufactures electronic instrumentation and electronic test equipment used by government and industry in the production of components for rockets, missiles, aircraft, radar and television. The equipment includes such instruments as oscilloscopes, electronic digital counters, digital volt-ohmmeters and vacuum tube volt meters, relay testers and other complicated instrumentation gear. The Hymac plant differs from many in the field in that it not only engineers and designs test equipment, but is also a producer with national distribution. The firm holds a number of exclusive designs and patents in the instrumentation field.

Josh W. Gershuny, is vice president and general manager of Hymac and has been named president. The Hymac design team will be retained to operate the plant, according to Duncan.

NEW AND NOW AVAILABLE! The completely new 1959 edition of the **DIESEL ENGINE CATALOG,** Volume 24 can now be purchased. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, the Catalog is essential to you. This giant, 400 page, 10½" x 13½", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs $10 postpaid anywhere in the world. Send checks or company orders to **DIESEL ENGINE CATALOG,** 9110 Sunset Blvd., Los Angeles 46, Calif.

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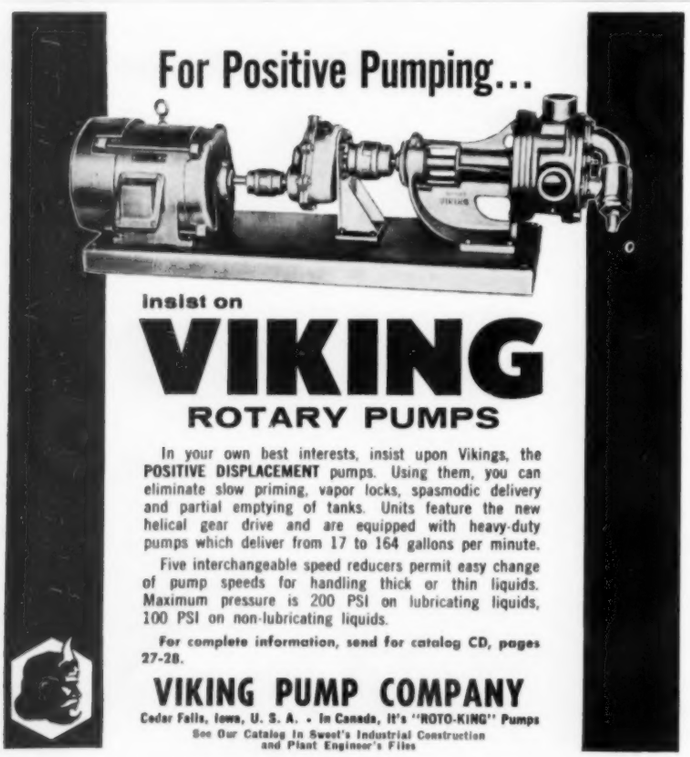
Southern Regional Manager

Leo Miller has been appointed southern regional industrial sales manager for Dayton Industrial Products Co., a division of the Dayton Rubber Co. Mr. Miller will work out of the company's new Atlanta warehouse handling sales in southeastern United States of the Dayton line of industrial V and cog belts, hose, poly-V drives, rubber and rubber-to-metal and molded products, according to Norman G. Lever, industrial department sales manager. Mr. Miller joined Dayton in 1955 as a district sales manager and prior to the new appointment had been assigned in Cincinnati, Ohio and Bakersfield, Calif.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See Our Catalog In Sweet's Industrial Construction and Plant Engineer's Files

Cleaner Removes Fuel Oil

A cleaning composition that removes fuel oil from electrical equipment without harming insulation, metal, or humans and also acts as an anti-rust agent has been developed by the Navy. The composition, described in a recent report just released to industry contains four components—hydrocarbon solvent, surfactant, penetrant, and water. In combination with a water-displacing composition developed earlier by the Navy, it quickly cleans electrical equipment fouled with oil and sea water. The formulation is described as relatively harmless to electrical insulation, less flammable than the fuel oil, free of skin irritants, non-corrosive, and non-toxic. It also retards rusting of ferrous surfaces. The illustrated report, PB 151670 "Salvage of Flooded Electrical Equipment," H. R. Baker and P. B. Leach, U.S. Naval Research Laboratory, June 1959, may be ordered at 75 cents per copy from OTS, U.S. Department of Commerce, Washington 25.

Tandem Drive Manual

A 20 page, illustrated industry service manual on truck installation of V-belt drives for tandem axles has been published by Dayton Industrial Products Co., a division of The Dayton Rubber Co. Explained in the new manual are methods for the installation of V-belt drives on various types of truck tandem axles for both disc-type and spoke-type wheels, according to W. F. Moore, tandem V-drive sales manager for DIPCO. The manual also outlines various types of Dayton sheaves for use with its line of Thoro-Trac V-belts and de-icer bands, and also covers installation methods. Maintenance information, tire, wheel, rim, clamp and spacer data, including tables on tubeless and tube-type tires, tractor-wheel spoke lengths are also included, Moorse said. The manual is available without cost from Tandem V-Drive dept., Dayton Industrial Products Co., 2001 Janice St., Melrose Park, Ill.

ITS NEW

50 International Diesels Go to Burlington Truck Lines, Inc.

Burlington Truck Lines, Inc., has taken delivery of 50 International model DCOF-405 diesel-equipped tractors as part of a fleet expansion and modernization program, it was announced by Yale James, vice president—operations. The 50 heavy-duty trucks represent an investment of more than $1 million.

Use of the new trucks is expected to improve Burlington schedules by permitting higher average road speeds within legal limits. They will pull 40 ft. semi-trailers, which provide increased load capacity over previous equipment. The heavy-duty tractors are scheduled to operate primarily between Chicago and points in Missouri, Iowa and Nebraska. Company headquarters are at Galesburg, Ill. The International tractors are tandem-axle models rated at 76,800 lbs. gross vehicle weight. They are equipped with Cummins NH-195 diesel engines, 12-speed Spicer transmissions, 11,000 lb. front axles and 72 in. cabs. Wheelbase is 146 ins.

New Hercules Distributor

Franconi Auto Parts, 584 Market St., Kingston, Pa., has been appointed northeastern Pennsylvania distributor for Hercules Motors Corp. The Kingston firm will handle Hercules' line of air-cooled and liquid-cooled gasoline, diesel and natural gas engines for automotive, industrial and agricultural applications.

Parker Fittings Distributor

Appointment of Sturgis Valve & Fitting Corp., 601 S. Taylor Ave., St. Louis 10, Mo., as a distributor for Parker industrial tube fittings and tools, is announced by D. A. Cameron, general sales manager-distributors, Parker-Hannifin Corp.

General Parts Manager At Detroit Diesel Retires

Robert E. Hunter general sales manager of the Detroit Diesel Engine Division of General Motors announced appointment of Robert B. MacArthur as general parts manager. Mr. MacArthur succeeds John Ball who retired December 31 after 31 years of service with General Motors. Mr. MacArthur joined Detroit Diesel's parts department under Ball in 1950, later transferring to the regional field sales group. In December 1958 he was appointed a regional manager in charge of the Division's sales and service activities in Michigan, Indiana, Ohio and parts of Kentucky and Pennsylvania. Mr. Ball joined General Motors as a supervisor in the central office technical data section in 1928. He transferred to Detroit Diesel in 1942, where he organized the then new GM Division's extensive parts merchandising facilities. In addition to general parts manager, Ball also served as assistant to Robert E. Hunter, general sales manager.

New Cummins Dealer

Cummins Diesel Michigan Inc. has announced a new dealer appointment: Gersonde Equipment Co., Inc. Benton Harbor, Mich. It is an International truck dealer in the Benton Harbor area and has been appointed an authorized Cummins maintenance dealer, handling both sales and service for Cummins.

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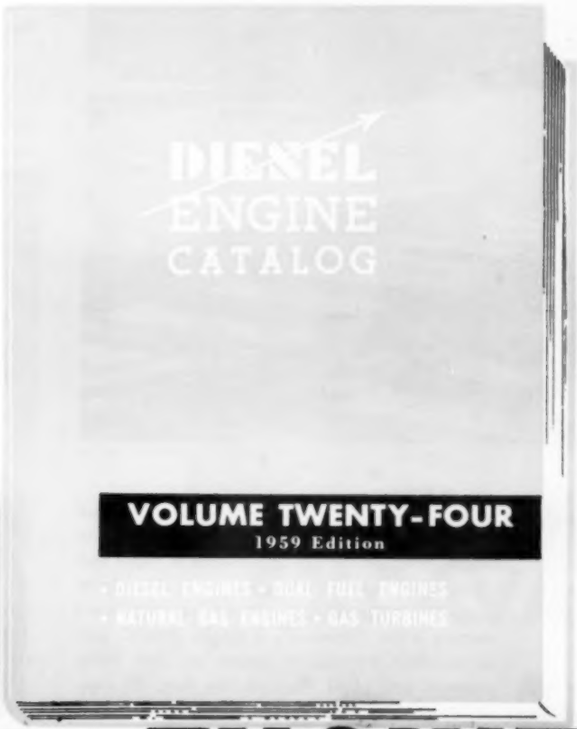

1959 DIESEL ENGINE CATALOG

LOOK AT THE CONTENTS!

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2. TURBOCHARGERS and SUPERCHARGERS — This section of manufacturers is detailed and fully illustrated to give complete information on this increasingly important phase of the industry.

3. TRANSMISSIONS — The latest information on torque converters, fluid drives, and other modern means of transmitting power are fully described and illustrated in this section.

4. ACCESSORY EQUIPMENT — Recent developments in fuel injection systems, governors, and other key accessory units are detailed and illustrated fully in this section.

5. MARKET PLACE — A convenient, time-saving listing of sources from which you can obtain the multitude of items and services needed by the fast growing Diesel Industry.

6. ADVERTISING — Leading manufacturers of engines, accessories, and services bring out the important features of their products in attractive, easy to read advertisements to further enhance the reference value of the CATALOG.

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NEW FREIGHT LOCOMOTIVES IN DEMONSTRATION RUNS

A NEW design in diesel electric locomotives, 2400 hp units built exclusively for high speed priority freight service, began demonstrations recently on the New York Central Railroad. The new ALCO DL-640 units, with turbocharged 2400 hp diesel engines and four-motor traction drive, took one of the nation's crack freight trains from Central's 72nd st., yard to Chicago. The three-unit combination produces 7200 hp over 12 axles.

The Central's LS-1 is a fast scheduled run averaging 100 cars. It operates on a 29 hr. schedule between New York and Chicago. On arrival in Chicago, the three unit combination was scheduled back to New York with another run, NY-2, with a normal 31½ hr. schedule, averaging 90 cars. LS-1's schedule, according to Central, is comparable with the fastest New York-Chicago freight runs, and has the latest loading schedule, 9:30 p.m. daily, of any fast freight originating in New York.

The DL-640's 2400 hp and four traction motors results in a 50 per cent increase in the hp/axle, boosting speed potential of the locomotive, ALCO reported. ALCO has built five DL-640's, all powered by the firm's model 251 engine. They will be demonstrated in combinations of three and two units. The two sets are scheduled for demonstration service on 22 different American railroads.

This combination of three new-design 2400 hp ALCO DL-640 diesel locomotives, now in demonstration service on the New York Central. Photograph shows the three-unit, 7200 hp hookup on a sanding station at the Delaware and Hudson yard in Mechanicville, N.Y. between shakedown runs.

"Economics of Engine Power" Is Theme for Kansas City Oil & Gas Power Meeting

May 22 through 26 are the dates established for the 32nd Annual Conference and Exhibit of the ASME's Oil & Gas Power Division in Kansas City, Mo. at the Muehlebach Hotel. Based on early reports, the program is one that will be of definite interest and value to men concerned with the design, development and application of diesel and natural gas engines. According to J. T. Adams, conference chairman, the theme of this year's meeting is the "Economics of Engine Power", and an excellent selection of papers are now being reviewed and plans finalized. To date, 25 companies are planning exhibits, but additional space is still available. Manufacturers interested are asked to write John E. Onnen, Koppers Co., 122 S. Michigan Avenue, Chicago 3, Ill. Hotel reservations are being accepted by the Hotel Muehlebach and registration will begin Sun., May 22.

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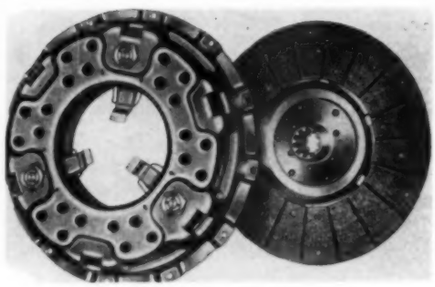
New Lipe Clutches

Lipe-Rollway Corp. announced a new 15 in. direct pressure heavy duty clutch designed to produce greater torque at less weight for diesel engines. The largest unit in Lipe-Rollway's line of direct pressure clutches for truck, tractor, bus and industrial use, the 15 in. DPB, is available in single or two-plate models which may be used with pot or flat flywheels. The units feature stronger, lighter stamped covers as well as friction-free needle bearing linkage as standard equipment. Torque range is from 925 to 1,295 ft. lbs. static torque for single plate to 1,850 to 2,600 ft. lbs. static torque for two-plate. The single plate is recommended for engines developing up to 600 to 850 ft. lbs. gross torque; the two-plate, from 1,200 to 1,680 ft. lbs. The 15 in. DPB's 24 cylindrical type pressure springs are made of chrome silicon steel and are used with insulating washers to provide greater heat resistance, lower fade rate. In two-plate model, the center plate is of close-grain high tensile iron that resists warpage. For further information, write Clutch Division, Lipe-Rollway Corporation, Syracuse, New York. ITS NEW



The new Lipe-Rollway direct pressure heavy-duty clutch.

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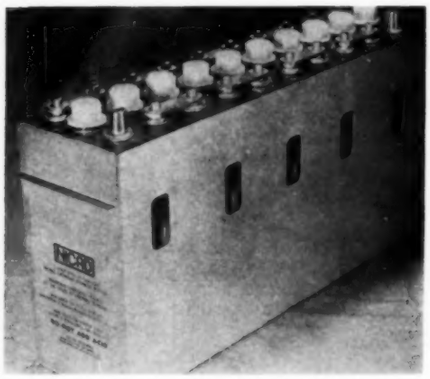
2093 East 19th St., Cleveland 15, Ohio
America's largest GM fuel injector rebuilder

New Hercules Motors President

P. O. Peterson

P. O. Peterson has been elected president and chief executive officer and a director of Hercules Motors Corp. He fills the vacancy caused by the resignation of William L. Pringle, who is leaving Hercules to accept another position in the automotive industry. Mr. Peterson was president of Mack Truck Inc. from 1955 to 1958. During this period, Mack's sales doubled, profits increased several fold and cash dividends were resumed. Working capital increased approximately 225 per cent and the number of shareholders increased approximately 50 per cent. Mr. Peterson was with Studebaker Corp. in various capacities before joining Mack. He was director of purchases, treasurer of a subsidiary, vice president in charge of operations and executive vice president from 1951-54.

Reefer Unit Battery



A 12-volt, 62 ampere hour Nicad nickel cadmium alkaline battery has been chosen for diesel engine starting in mechanically refrigerated railroad cars. Because of exceptionally low internal resistance, it is capable of delivering heavy starting currents in temperature ranging from –40°F to +165°F. For information on applications, cost and performance, write to Nicad Division, Gould-National Batteries, Inc., Easthampton, Mass.

Hartford Midwest Manager

J. F. Bushnell

James J. Ford, general manager of the Fuel Injection Division of the Hartford Machine Screw Co. has announced the promotion of Jonathan F. Bushnell to Manager, Midwest region. He has been serving as sales and service engineer in the Midwest area since April 1958. William T. Lewis has been appointed Sales and Service Representative of the Chicago area to cover customer contact on all phases of Roosa Master fuel injection pump equipment. Mr. Bushnell joined Hartford Machine Screw Company in 1946 after service in the U. S. Navy. In 1947 he was assigned as a development engineer to the Fuel Injection Division for the Roosa Master fuel injection pump. In 1952 he was placed in charge of assembly and testing operations, a service he performed until his appointment to the Midwest area. Mr. Lewis recently joined the Roosa Master organization. Since 1957 he has been sales engineer in fuel injection with Marvel Schebler Division of Borg-Warner, Decatur, Ill.

Voltage Regulator Temperature Gauge

Kent-Moore Org., Inc. announces availability of a new voltage regulator temperature gauge. This tool was developed because voltage or regulator settings made without accurate reference to the temperature of the regulator can create serious problems in under or over-charge rates. This thermometer is attached magnetically to the regulator to provide instantaneous temperature data. Information on the J 8529 gauge can be obtained by writing Kent-Moore Org. Inc., Warren, Mich.

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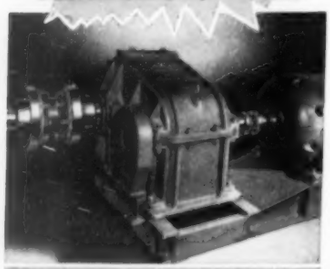

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ADVERTISERS' INDEX

Air-Maze Corporation, The ... 65
Alco Products, Inc. ... 18
Allis-Chalmers ... 11
American MARC, Inc. ... 74
Amot Controls Corp. ... 61
Bendix Aviation Corp. Scintilla Division ... 16
Bosch Corporation, Robert ... 55
Brad Foote Gear Works, Inc. ... 71
Caterpillar Tractor Co. Engine Division ... 4
C.A.V. Ltd. ... 68
Cities Service Oil Co. ... 20
Clayton Manufacturing Co. ... 64
Cleveland Diesel Engine Div. General Motors Corp. ... 13
Commercial Filters Corp. ... 60
Cooper-Bessemer Corp. ... Fourth Cover
Dana Corporation ... 9
Delco-Remy Division General Motors Corp. ... 22-23
Detroit Diesel Engine Division General Motors Corp. ... Third Cover
Diesel Energy Corporation ... 17
Donaldson Company, Inc. ... 14
Eaton Manufacturing Co. ... 57
Electric Machinery Mfg. Co. ... 74
Emhart Manufacturing Co. Maxim Division ... 70
Engineering Controls, Inc. ... 53
Fuller Manufacturing Co. ... 7
Garrett Corporation, The (AiResearch Industrial Div.) ... 10
General Motors Corp. Cleveland Diesel Engine Div. ... 13
Delco-Remy Division ... 22-23
Detroit Diesel Engine Div. ... Third Cover
Harrison Radiator Division ... 2
Harrison Radiator Division General Motors Corp. ... 2
Hartford Machine Screw Company ... 58
Hercules Motors Corporation ... 56
Illinois Testing Laboratories, Inc. ... 63
International Harvester Co. ... 1
Interstate Diesel Service, Inc. ... 78
Kato Engineering Company ... 76
Lycoming Division of Avco Mfg. Corp. ... 21
Maxim Division Emhart Manufacturing Co. ... 70
M-C-M Machine Works Co. ... 78
Murray & Tregurtha, Inc. ... 75
Nugent & Co., Inc., Wm. W. ... 72
Perfect Circle Corporation ... 62
Perkins (Canada) Ltd., F. ... 79
Purolator Products, Inc. ... 12
Quincy Compressor Co. ... 66
Rockwell-Standard Corp. Transmission & Axle Division ... Second Cover
Schwitzer Corporation ... 19
Scintilla Division Bendix Aviation Corp. ... 16
Standard Oil of California ... 24
Standard Oil Co., (Indiana) ... 5
Stewart & Stevenson Services, Inc. ... 15
Thomas Flexible Coupling Co. ... 80
Viking Pump Company ... 76
Waukesha Motor Company ... 67
White Diesel Engine Div. The White Motor Company ... 8
Wilkening Manufacturing Co. ... 59
Woodward Governor Company ... 6
Yates-American Machine Co. ... 69
Young Radiator Company ... 73

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That's what is being done by R. P. Waldie, General Manager of Rocky Mountain Mining and Transport Company, uranium ore haulers in Grants, New Mexico.

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Rocky Mountain Mining and Transport hauls uranium ore from mine to mill. They operate at an altitude of 6200 feet . . . haul up to 60,000 lbs. GCW over tough grades in temperatures as low as 14° below zero.

When it comes to overhaul costs Mr. Waldie says, "We're getting an additional 60,000 to 100,000 miles between overhauls on our GM Diesel powered rigs. Also, we figure it costs us about $1500 to do a major on a GM Diesel and about $3700 on the other make. We save on operating and overhaul costs and get more time on the road."

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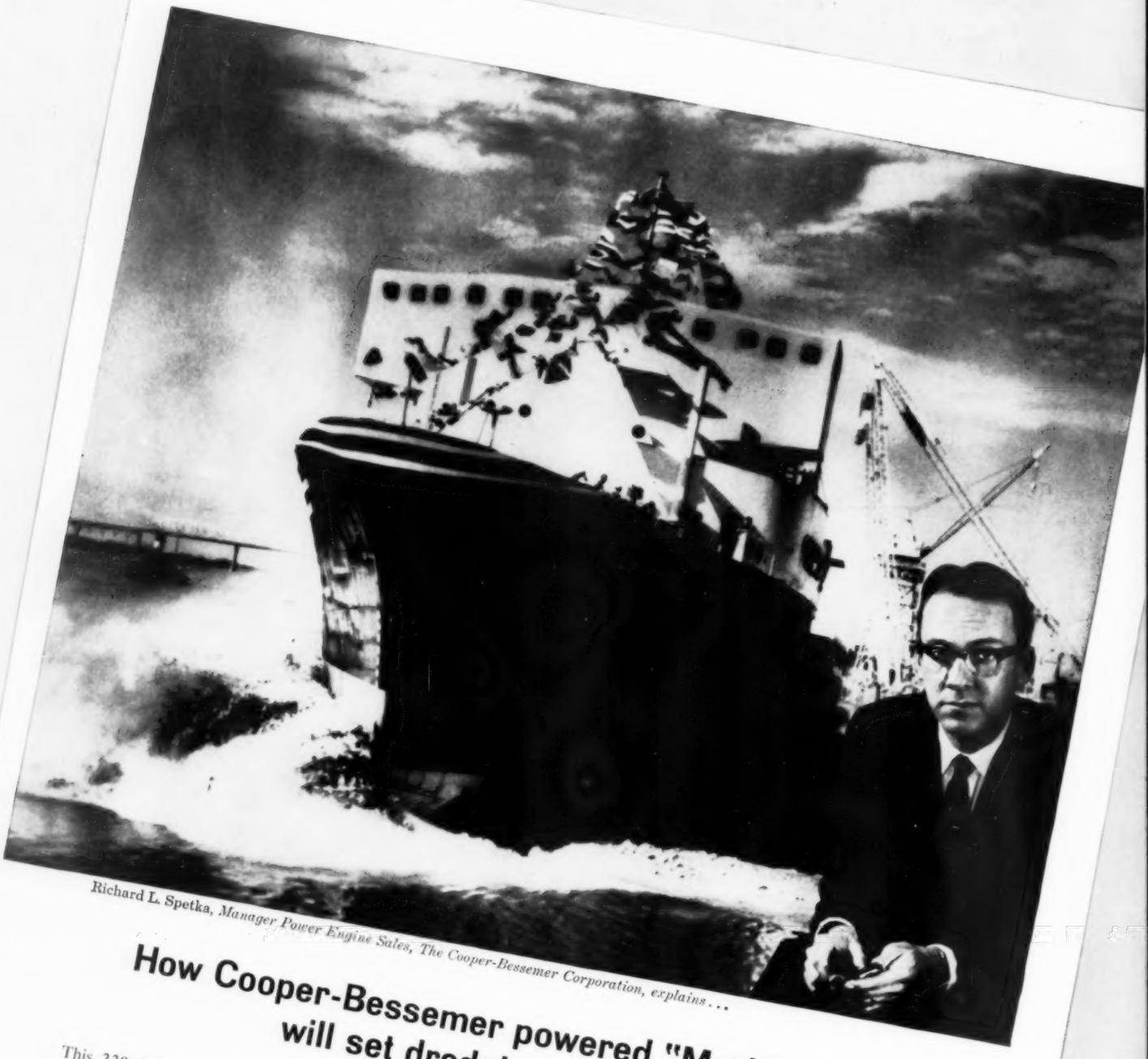

Richard L. Spetka, *Manager Power Engine Sales, The Cooper-Bessemer Corporation, explains . . .*

How Cooper-Bessemer powered "Markham" will set dredging records

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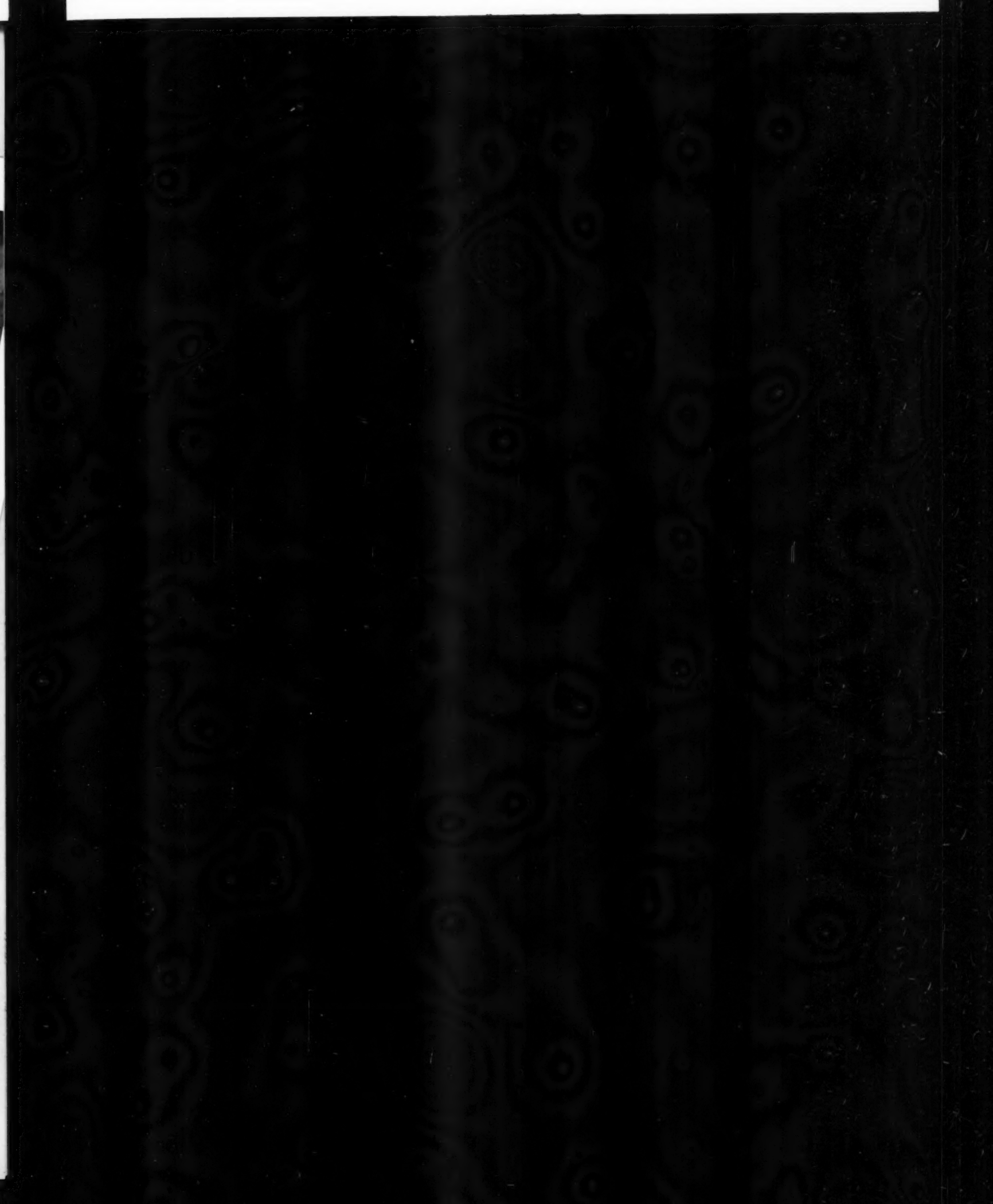
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